

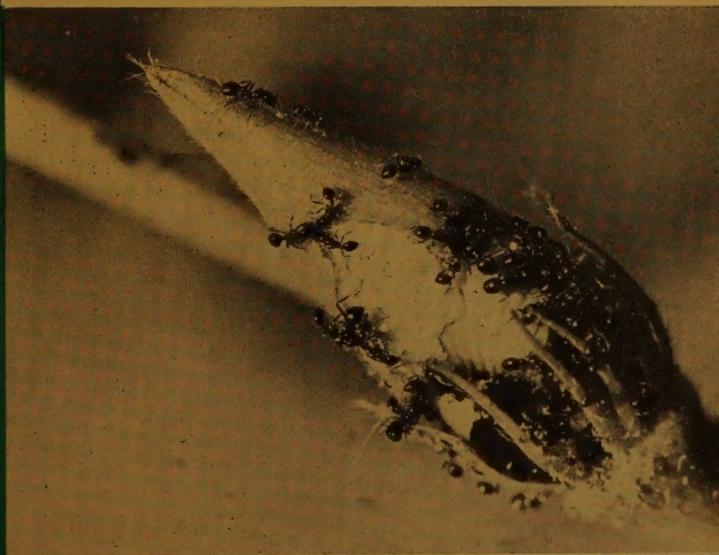
AGRICULTURAL

Chemicals

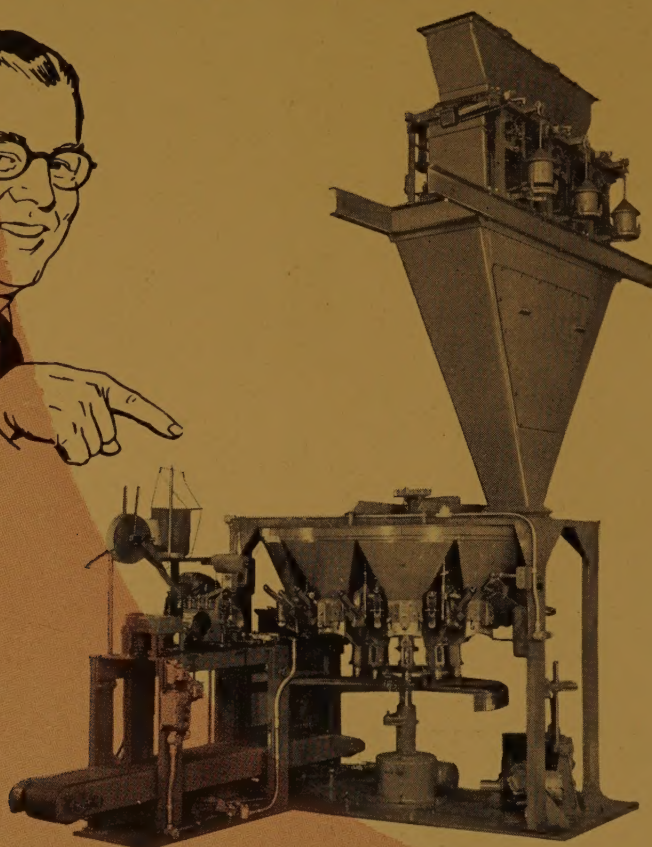
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Fertilizer Pilot Plant
Fire Ant Spray Program
Alabama Pestorama
California Weed Meeting
Fine Grinding Advances
Latest on the Gibberellins
New Herbicides

FEBRUARY, 1958



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"THE BAGPAKER"*

IP's Improved, New "Model AF"

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INSECTICIDE PROGRAM



**SALES
SUPPORT
IN
DEPTH!**



THE 1958 HEPTACHLOR DEALER "SALES-BUILDER" PROGRAM—For many years, Heptachlor promotional campaigns have helped formulators increase demand at the dealer level.

In 1958, we would like to increase this support of your own sales program. For this reason, we have taken the best features of previous programs, and added new features, based on information obtained in discussions with farm supply dealers everywhere. The result is a more comprehensive and penetrating program: sales support in depth.

INSECT CONTROL REFRESHER COURSE—We have found that most dealers would appreciate more basic information about the use of insecticides. On the other hand, any dealers who are experts themselves must work with inexperienced sales people. Also, your own salesmen cannot afford to spend the time necessary to explain all aspects of insecticide use to all dealer personnel. Thus, the 1958 Heptachlor program will include an informative "salesman's insect control refresher course." Your dealers will be provided with information that will enable them to discuss insecticides more freely with their customers. It will enable them to sell insecticides with authority and intelligence. Included in the program

will be "down to earth" sales techniques that every dealer can use, regardless of size.

MONTHLY INSECT CONTROL GUIDE SHEET—Each month, your dealers will receive an insect control guide sheet, containing information about crop pests common to their part of the country. These sheets will include insect appearance, life habits, damage, control. They will serve as a continuing textbook.

MONTHLY INSECT CONTROL INFORMATION SERVICE — NEW PROMOTIONAL AIDS—Current insect control information will be provided on a continuing basis through a monthly newsletter. There will also be many profit-making promotional aids. Participating dealers will receive advance copies to stay ahead of competition.

OTHER IMPORTANT FEATURES—Those of your dealers who participate in the Heptachlor program will receive a free listing in any Velsicol advertising run in their local areas. A reference list of these dealers will be prepared, and sent to farmers who request the name of a source for Heptachlor formulations.

FIND OUT NOW HOW THE 1958 HEPTACHLOR PROGRAM CAN HELP YOU INCREASE DISTRIBUTION AND SALES! MAIL THIS COUPON TODAY!



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VELSICOL CHEMICAL CORPORATION
330 East Grand Ave., Chicago 11, Ill.

International Representative: Velsicol International Corporation, C. A.
P.O. Box 1687 • Nassau, Bahamas, B.W.I.

VELSICOL CHEMICAL CORPORATION

AC-28

330 East Grand Avenue, Chicago 11, Illinois

Please send me complete details of the 1958 Heptachlor Insecticide Dealer Sales-BUILDER Program.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

HEPTACHLOR	CHLORDANE	ENDRIN
PARATHION	METHYL PARATHION	GIBBERELLINS

This Month's Cover

The Imported Fire Ant is currently in the entomological lime light as the U.S.D.A. gets under way with an eradication program in a band of southern states where infestations are assuming serious proportions. The cover photos show (top) Fire Ant feeding on unopened flower bud of okra, and (bottom) cross section of Fire Ant mound showing sponge-like interior. Photos courtesy USDA.

Vol. 13, No. 2

February, 1958

AGRICULTURAL

Chemicals

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NEW granular triple

*non-crumbling, free flowing
...and it ammoniates*

Something new and different?

Yes . . . so new, in fact, there's no other granular triple super like it in the industry. The reason:

Every granule of International's new Triple Super has a unique sponge-like structure to *facilitate ammoniation* and contribute to desirable granular texture in your mixed goods. Yet each granule has plenty of strength to stand up without crumbling during handling.

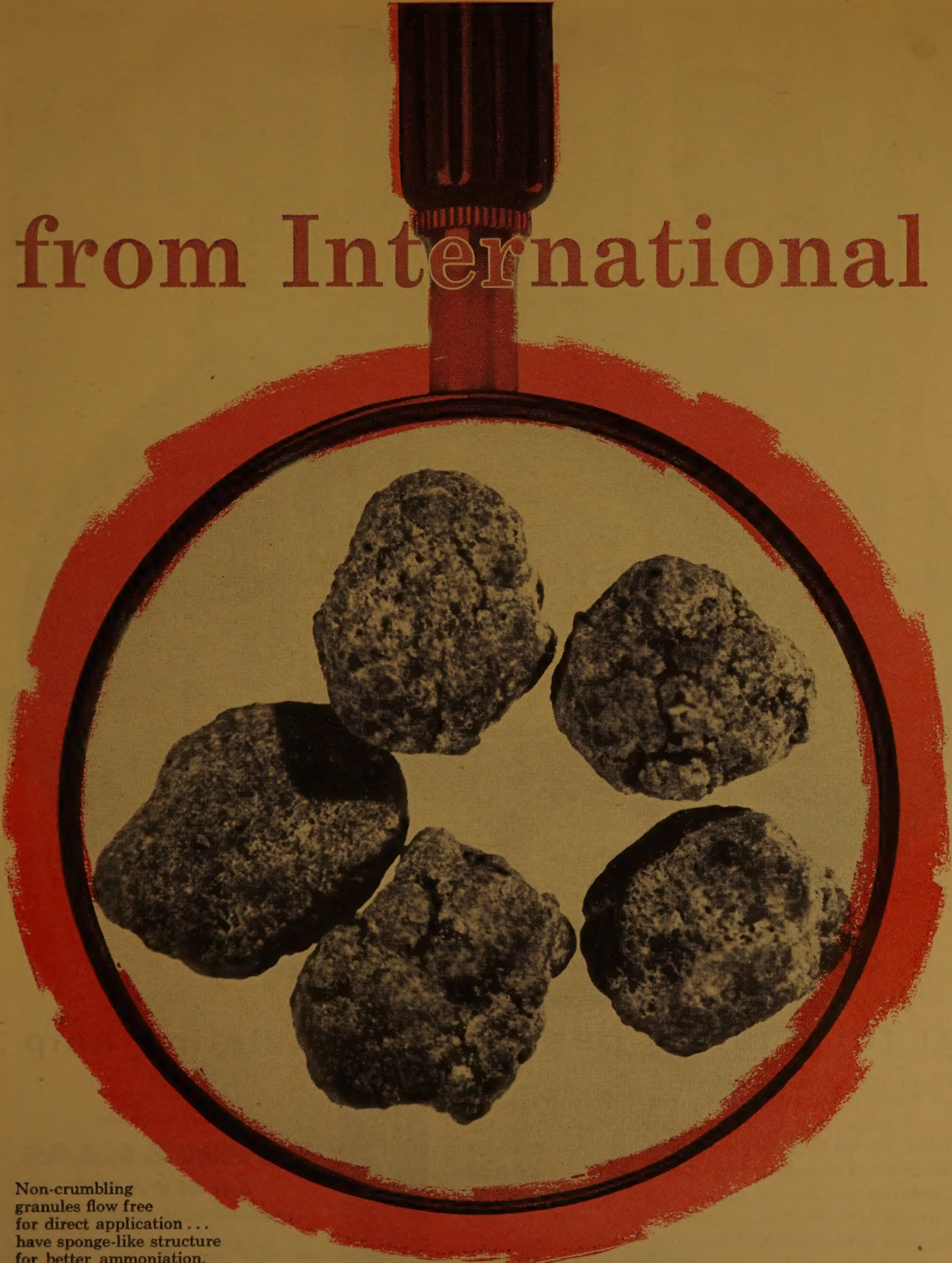
Important, too . . . you can't beat this new granulated triple for *direct application*. It's

packed with customer-pleasing qualities. International granules are non-crumbling . . . free flowing. They won't bridge over in a fertilizer drill . . . won't crumble during handling or spreading.

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Write or wire for full information.





from International

Non-crumbling
granules flow free
for direct application . . .
have sponge-like structure
for better ammoniation.

INTERNATIONAL MINERALS



& CHEMICAL CORPORATION

PHOSPHATE CHEMICALS DIVISION

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There's a Rohm & Haas fieldman in your territory. It's his job to give you special help in formulating emulsifiable pesticide concentrates. He can help you develop a custom blended emulsifier by using only TRITON X-151 and TRITON X-171 . . . resulting in a concentrate that has the proper *spontaneity*, *storage stability* and *performance* in water that is hard or soft . . . warm or cool. When you ask for his advice, you benefit from both the fieldman's own long experience and from the special knowledge and ability of Rohm & Haas—a pioneer organic insecticide and emulsifier manufacturer, and your partner in crop production.



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AGRICULTURAL CHEMICALS

AMMONIA

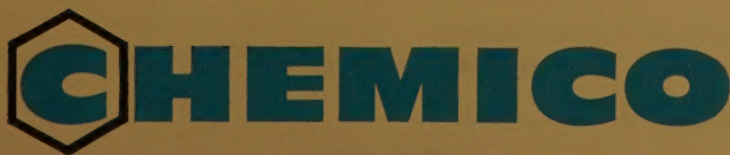


By the Push-button Process

Ammonia plant start-up operations are virtually a matter of "push-button" routine with Chemico; for Chemico has designed and constructed more than 50 ammonia plants in the last 40 years.

While new-comers to the field are constantly running into costly difficulties and delays with unreliable and even untried processes, Chemico designed plants are profitably producing an estimated 25% of the world's synthetic ammonia. Investors in the chemical industries may be interested to learn that despite the proven performance and countless advantages of Chemico's ammonia processes, it frequently costs less to build a Chemico Plant.

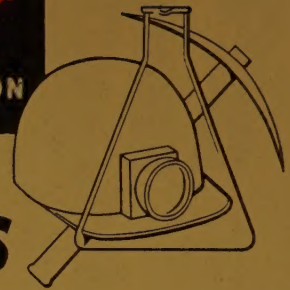
Write today for Chemico Bulletin #357 which lists the alternate feed stocks and methods for gas purification and production in the making of ammonia. .



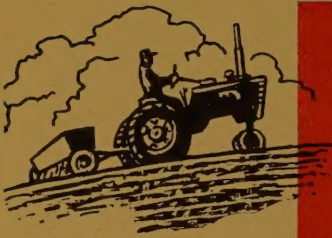
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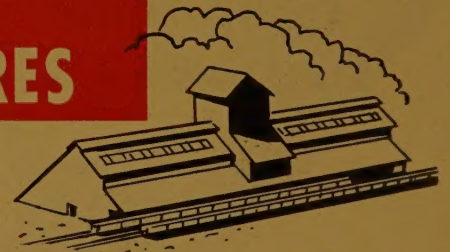
FEBRUARY, 1958



PRIMARY PRODUCERS OF FERTILIZER CHEMICALS



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MANGANOUS OXIDE
COPPER SULFATE
ZINC SULFATE
IRON SULFATE
MINERAL MIXTURES**



We have manufactured and maintained a constant research program in the field of nutritional trace elements and their application to fertilizers for more than thirty years. Our background and basic position in this field is your assurance of a plentiful supply of quality materials.

YOU cut cost with combined carloads from one basic source.

YOU can save money, time, plant space and effort through the use of our custom formulated mineral mixture service.

WE back up our products with service, research and technical assistance.

NUTRITIONAL TRACE ELEMENTS ARE OUR BUSINESS

Foliar Nutritional Products Include

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Make request on your Company letterhead for samples or literature.

TENNESSEE



CORPORATION

617-629 Grant Building, Atlanta, Ga.



How Rapid Delivery of Sinclair Nitrogen Products CAN SAVE YOU TIME AND MONEY

Rapid—on-time—delivery to your plant is an important reason why you should order nitrogen supplies from Sinclair. It can make the difference between filling an order at a profit or losing a sale and customer good will.

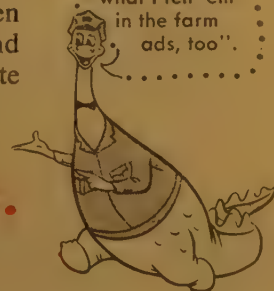
A big, new nitrogen plant at Hammond, Indiana, is in the center of the nation's

rail and truck transportation network. Large storage facilities in this key location mean that your order can be filled for fast delivery when you need it.

For fast, low-cost delivery of nitrogen solutions, anhydrous ammonia and aqua ammonia call on Sinclair. Write or phone . . .

Dino, the Sinclair Dinosaur, says,

"Fertilize for greater farm profits. That's what I tell 'em in the farm ads, too".



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CHEMICALS



Handwheel Operated



Lever Operated



Power Operated

Grinnell-Saunders Diaphragm Valve

... the valve unsurpassed for handling fertilizer chemicals as diverse as nitric, sulphuric, phosphoric acids and their ammonium, sodium or potassium salts

Whether diaphragm is "open" or "closed", valve's bonnet mechanism never comes in direct contact with the fluid stream — thus preventing abrasion and corrosion of those working parts.

For the same reason, because diaphragm completely seals off working parts, stem leaks are impossible.

Grinnell-Saunders Diaphragm Valves are available in a wide range of body, lining and diaphragm materials. If you have a valve problem, write Grinnell Company, Inc., 277 West Exchange St., Providence, Rhode Island.

GRINNELL
WHENEVER PIPING IS INVOLVED

Choice of Materials

Bodies — iron; cast steel; stainless steel; alloy "20"; Hastelloy A, B, C; aluminum; PVC (polyvinyl chloride); Saran

Body Linings — hard rubber; soft rubber; neoprene; glass; lead; plastics; Heresite; Lithcote

Diaphragms — soft natural rubber; natural rubber; white synthetic rubber; neoprene; reinforced neoprene; butyl; Hy-car; Teflon; Kel-F; PVC (polyvinyl chloride); polyethylene

Bonnets — iron; stainless steel; other materials on special order

Choice of Bonnets

Handwheel (non-indicating stem, indicating stem); chain wheel; lever (for quick operation); sliding stem (for a wide selection of power operated topworks)

Choice of Bodies

Conventional weir type

Straight — screwed; flanged; socket weld; butt weld; socket (solder); sanitary threads; hose ends; Victaulic

Angle — screwed; flanged; socket weld

Other types

Straightway Valves offer straight thru flow. (Plastic diaphragms not available.)

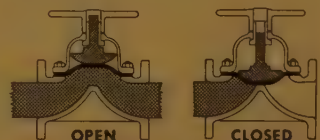
Operating Features

- diaphragm completely isolates bonnet mechanism from the fluid in the line

- diaphragm lifts high for streamline flow in either direction

- diaphragm presses tight for positive closure

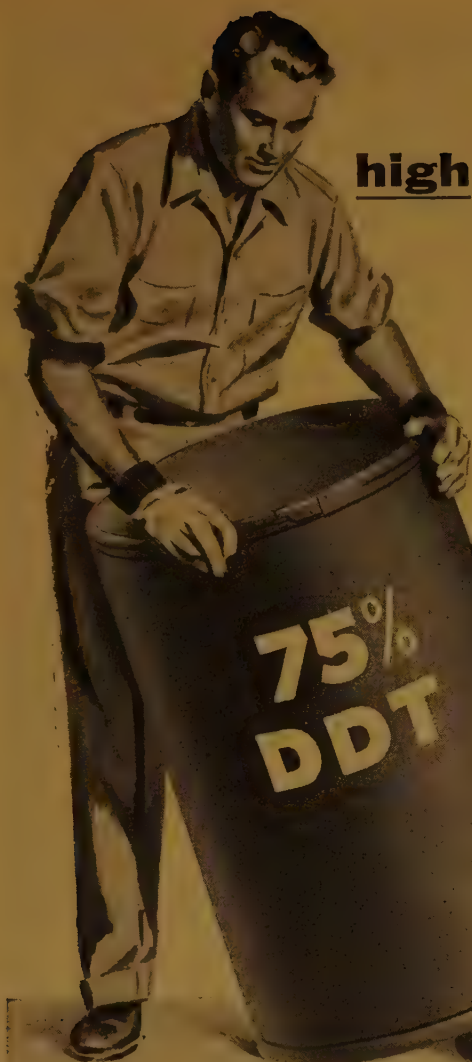
- simple maintenance—diaphragm easily replaced without removing valve body from line



Grinnell Company, Inc., Providence, Rhode Island

Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic fire protection systems • Amco air conditioning systems



**NOW you can formulate
high concentrate wettable powders
at low cost with
MICRO-CEL**

SUBSTANTIAL FORMULATION SAVINGS

Micro-Cel*, a new line of synthetic calcium silicates, has extremely high absorptive properties. It is this remarkable capacity for absorption that makes it possible to prepare wettable powders with higher concentrations of dry, viscous or liquid poisons. Micro-Cel's absorption also means that more lower cost diluents can be used. Thus high strength formulation costs are now cut to a new low.

REMAINS FREE-FLOWING—MEETS STORAGE TESTS

With Micro-Cel, these high concentrates will remain in a free-flowing state even after prolonged storage. This is particularly important in producing poisons for the export market.

In addition, suspension values after storage of 1.5

to 2.0 I.C.A. have been achieved in 75% DDT wettable powders, based on Micro-Cel. This is more than adequate for storage conditions encountered in most tropical countries.

DEVELOPED BY JOHNS-MANVILLE RESEARCH

Micro-Cel is another development of Johns-Manville Research. Combining high absorption, large surface area, small particle size and excellent dry flowability, it offers a unique combination of properties for insecticide formulation and other process needs.

Sample quantities and carload shipments are now available. Write for further data and sample formulations for poisons of interest to you. Or ask a Celite engineer to help you adapt Micro-Cel to your particular requirements and specifications.



*Micro-Cel® is Johns-Manville's new absorbent-grinding aid designed specifically for the insecticide formulator.

**Johns-Manville
MICRO-CEL**

SYNTHETIC CALCIUM SILICATES
A PRODUCT OF THE CELITE DIVISION

Johns-Manville, Box 14 New York 16, N.Y.

In Canada: Port Credit, Ontario

Please send ☐ further information; ☐ samples of Micro-Cel. I am interested in using Micro-Cel with the following poisons:

☐ Please have your local representative contact me.

Name _____ Position _____

Company _____

Address _____

City _____ Zone _____ State _____



Drilling blast holes with a multiple mounted drill
in the Duval mines near Carlsbad, New Mexico.
One of the many processes which bring you . .

High Grade Muriate of Potash...

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Pyrenone^{*} Dairy Sprays

**Won't Show up in Milk or Meat
Safer, More Effective Against "Resistant" Flies**

IN many cases infants, invalids and the aged rely almost wholly on milk as the mainstay of their diets. Even the average person's diet consists of 29% milk or milk products. No wonder the Food & Drug Administration objects to even trace amounts of insecticidal residues in milk.

Laboratory analyses of milk and meat from cows sprayed with Pyrenone for 4 successive years — right up to the time the samples were obtained — showed no *piperonyl butoxide* or *pyrethrins* in the milk, muscle or fat tissues.

Dairy sprays based on Pyrenone are not only safer for use in barns, cattle pens and milk rooms, but they are highly effective against resistant flies. Pyrenone emulsions

provide prolonged protection against horn flies, mosquitoes, sand flies, stable flies — and even 3 to 5 days' protection against tabanids!

Where insect control is inadequate or non-existent, these annoying biting flies keep beef-weights down . . . and lower the butter-fat content of milk.

For complete information on Pyrenone-based concentrates, suitable for exacting formulations and for use in automatic treadle sprayers . . . aerosol generators . . . conventional sprayers . . . and the more recent "push button" fly-control installations in dairy barns, contact the nearest office of Fairfield Chemical Division, Food Machinery and Chemical Corporation.

*REG. U.S. PAT. OFF., F.M.C.

Pyrenone

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Fairfield Chemical Division

Sales Headquarters

441 LEXINGTON AVENUE, NEW YORK 17, N. Y.

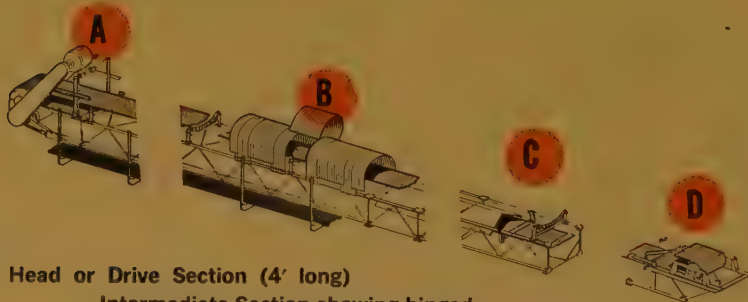
Branches in Principal Cities. In Canada: Natural Products Corp., Montreal and Toronto.



NEW IDEA

in prefabricated
belt conveyors

JOY READY-SPAN tubular design
requires no special engineering



A Head or Drive Section (4' long)

B Intermediate Section showing hinged cover (20' -8' -4')

C Intermediate Section showing optional return belt cover

D Tail section showing takeup and belt plow (4' long)

Just tell us the length, the speed, and the material you want to move and we can pull a Ready-Span prefabricated conveyor "off the shelf" for you. You'll get all the economies of pre-engineering plus all the advantages of a conveyor installation tailored to your needs.

Here's how it works: each section, including drive and tail terminals, is made up of four pipes connected by pipe diagonals forming a lace framed truss. Sections bolt together to form a straight, rigid, pipe frame truss.

All accessories—idlers, walkways, cover decking, hoods and supports clamp to the pipe anywhere you wish—without burning holes or using pre-arranged multiple holes that weaken the conveyor.

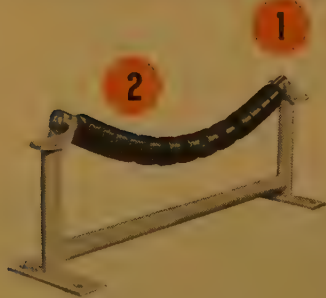
The Joy Ready-span is available in a variety of drive and take-up combinations for any standard belt width. Promptly available from stock to meet almost any handling condition.

Write for Bulletin 218-87

NEW IDEA

in conveyor belt idlers

JOY LIMBEROLLER



Radically different from all other idlers, the Limberoller is a single roll idler consisting of neoprene discs molded to a flexible steel cable. The entire idler turns on its own axis.

(1) Only two bearings are used, one at either end, up out of the dirt. (2) The idler supports the belt across its entire width . . . eliminates gaps left by ordinary 3-roll idler. This even support, combined with cushioning "no-bump" action of neoprene discs, can increase belt life 6 times and more. The Limberoller can be installed on *any* belt conveyor, even on existing conveyors.

Write for Free
Bulletin 218-87A

JOY

Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.

WSW L6967-218

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

Industry Meeting Calendar

Feb. 2-4—New York Garden Supply Show, New York Coliseum, New York City.

Feb. 3-5—Annual Meeting of the Southern Agricultural Workers, Little Rock, Ark.

Feb. 4-5—Kansas Insect and Weed Control Conf. Kansas State College, Manhattan, Kans.

Feb. 4-6—North Carolina Pest Control Operators' Short Course, College Union, Raleigh, N. C.

Feb. 10-11—Southwestern Branch, ESA, Annual Meeting, Shamrock Hilton Hotel, Houston, Tex.

Feb. 12-13—Shell Chemical Corp., Nematology Workshop, Hotel Stardust, Yuma, Ariz.

Feb. 13-14—Agronomists Industry Joint Meeting, Edgewater Beach Hotel, Chicago.

Feb. 20-22—Minnesota Fertilizer Industry Committee meeting of the Midwest Soil Improvement Committee and the University of Minnesota Nitrogen Conference, Lowry Hotel, St. Paul, Minn.

Feb. 26-27—Ohio-Indiana Agricultural Aviation Conference, Ohio State University, Columbus, Ohio.

March 4-5—Western Cotton Production Conference, Hotel Cortez, El Paso, Tex.

March 9-15—International Flower Show, New York Coliseum, New York City.

March 18-20—Western Weed Conference, Hotel Davenport, Spokane, Wash.

April 11-19—International Horticultural Congress, Nice, France.

April 13-15—California Fertilizer Conference, State Polytechnic College, San Louis Obispo

April 22—Western Agricultural Chemicals Association, Hotel Biltmore, Los Angeles.

June 9-11—Association of Southern Feed and Fertilizer Control Officials, Heart of Atlanta Hotel, Atlanta, Ga.

June 15-18—National Plant Food Institute, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 25-27—Pacific Branch, Entomological Society of America, San Diego, Calif.

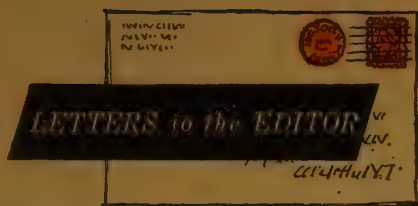
July 8-10—Pacific Northwest Plant Food Association, Regional Fertilizer Conf., Pocatello, Idaho.

July 18-19—Southwest Fertilizer Conference and Grade Hearing, Buccaneer Hotel, Galveston, Tex.

Oct. 22-24—Pacific Northwest Plant Food Assn., Gearhart, Oregon.

Oct. 29-31—National Agricultural Chemicals Association Annual Convention, Augusta, Ga.

AGRICULTURAL CHEMICALS



Drum Liners

I understand there is a liner manufactured that is used to line the inside of oil drums, and larger steel drums so they may be used for handling sulphuric and phosphoric acids.

We would appreciate it very much if you can give us the name, and address of a company in this business.

Bert Kesler

FERTILIZER PRODUCTS CO.
Durant, Oklahoma

Ed: Since we have no information on liners, perhaps one of our readers will wish to write to Mr. Kesler, his address is complete as listed above.

Chelating Compounds

I noted with interest some statements on page 49 of the October, 1957 issue of *Agricultural Chemical* concerning the use of chelating agents to increase the availability of fertilizer phosphorus. It was indicated that this work was being carried on in Portugal. I would appreciate receiving any specific reference which you might have concerning this work.

J. B. Hemwall

DOW CHEMICAL CO.,
Seal Beach, Calif.

Ed: Further information might be obtained from D. R. Monjardino, International Superphosphate Manufacturers Association, technical committee, 1 Avenue Franklin D. Roosevelt, Paris 8, France. The note in *Ag. Chem.* referred to a report by Dr. Monjardino.

Soil Testing Survey

In the October, 1957 issue of *Agricultural Chemicals*, page 97, reference is made to a survey on soil testing issued in December, 1956, by the Organization for European Economic Cooperation (O.E.E.C.) titled, "The Organization and Rationalization of Soil Analysis."

We are interested in obtaining a copy of this survey, and would appreciate any information you could give us as to where it may be obtained.

Donald C. Lawson

WESTERN COTTON OIL CO.
Lubbock, Texas

Ed: The address for the O.E.E.C. is: Suite 1223, 1346 Connecticut Avenue, N. W., Washington 6, D. C.

Fertidyne

We have seen in the "Technical Section" of the December, 1957 issue of *Agricultural Chemicals*, an article about the new "Fertidyne" for Soil Treatment, released by the I.B.C. Research Laboratories. I should like to be able to contact them for more information.

O. J. Asly

SOCIETE LIBANAISE D'AGRICULTURE
ET DE CHIMIE

Beyrouth, Argentine

Ed: IBC Research Laboratories, Inc. are located at 18 West 61st St., New York City. Wallace L. Minto is research director.

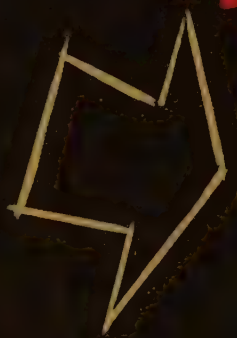


*In the
Spotlight
this Month*

- A new approach to chemical control of nematodes is provided by VC-13, a low volatile, chemically stable nemacide which is worked into the soil by mechanical means. Because it is not a fumigant, as are most other products for nematode control, none of the special equipment normally required for fumigation need be used. Page 30.
- Ureaforms have been used in formulating complete fertilizers with considerable success. Under the usual conditions of manufacture, ureaforms are relatively stable, with minimum loss of nitrogen. Page 34.
- Spencer Chemical solves production problems of the fertilizer mixer in its own ammoniator-granulator "pilot plant." Being able to *show* a mixer what they have found to be most efficient operating methods is much more effective than just writing him or telling him, they believe. For a full story on Spencer's set-up for a continuing study of mixer problems see article starting on page 42.
- Promising new herbicides discussed at recent annual meeting of Northeastern Weed Control Conference include EPTC, Neburon, Randox, Vegadex, the isobutyrate, the propionates and the triazines. Latest developments in weed control are highlighted in a report beginning on page 32.
- The USDA gets under way with its program for stamping out the fire ant in a group of southern states where it has become an increasingly serious pest problem. Page 51.
- Potash Company of America will be ready to start shipping potash from its new Canadian plant before the end of '58. By 1959 they expect to be producing at the rate of 600,000 tons a year of muriate. Page 59.
- Counts of boll weevil going into hibernation in the cotton belt reported at a very high level. The '58 growing season could see a big infestation. Spruce budworm expected to be a serious problem this coming season in Minnesota. Plant Pest Survey Section of USDA previews the pest picture for '58. Page 55.
- What success will Ike have in getting his new farm program through Congress and, whatever farm program is adopted, how will it affect sale of fertilizers and pesticides for the '58 growing season? If planting restrictions are removed will this give the ag chemical industry a boost or just the reverse? Our Washington reporter hazards a few guesses for what they are worth. Page 65.

immediate delivery

Prentox Heptachlor

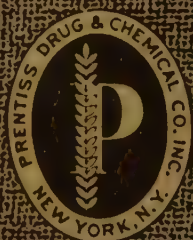


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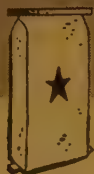
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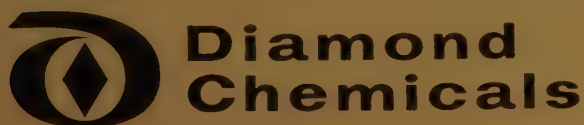
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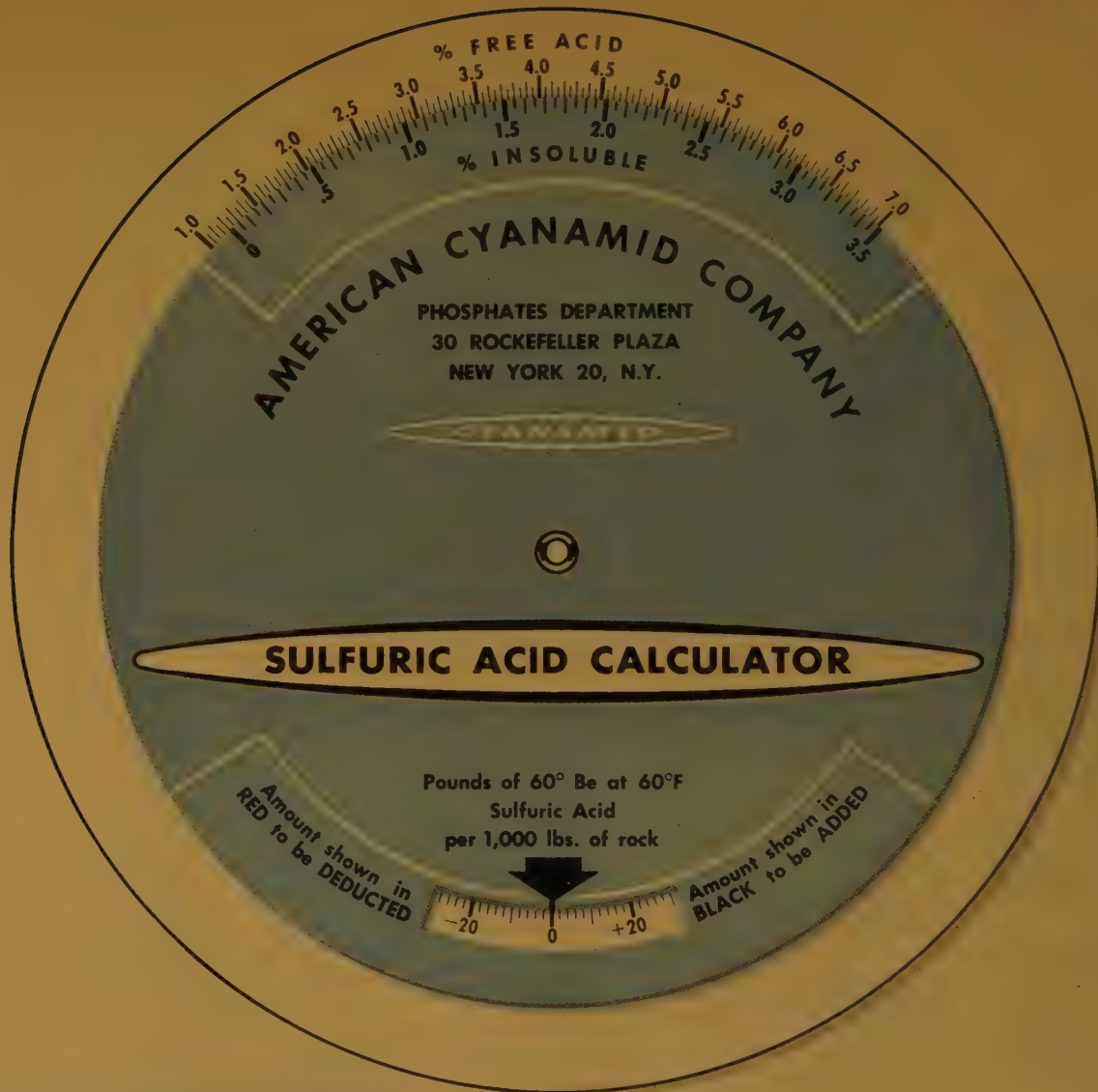
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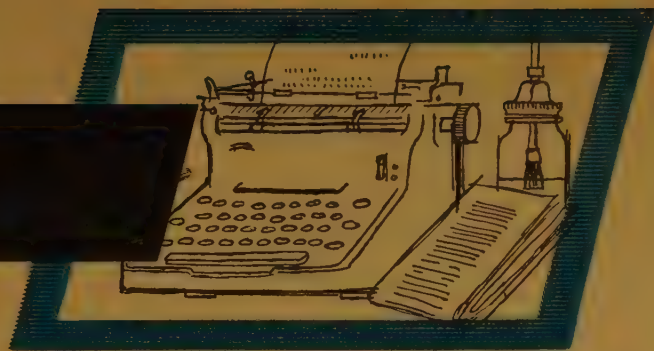
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EDITORIALS



THERE seems to be no denying the fact that the great post-war boom of the fifties has finally petered out, and we are at least six months to a year into a period of recession. How long it will run, and how deep it may cut are not yet apparent, but the economic facts of life remain inescapable. We find ourselves once more in the classical pattern, smack up against the realization that nothing can keep going up forever, whether it be stock prices, sales curves or "Sput-nick."

Fortunately most of the sign posts indicate that the reaction may not be with us for too long, nor carry our economy substantially below the peak levels at which we have been operating over the past few highly prosperous years. Defense spending continues at a high rate, the moderate group of unemployed still have access to substantial purchasing power, there has been no major unloading of big blocks of lightly margined security holdings as was the case in the thirties, and homes are remaining in the hands of their owners, rather than being turned back to the banks and the insurance companies, as they were during the Great Depression.

The agricultural chemical industry should be but little affected by the current general economic down trend. Much more important will be possible changes in the farm program, and the weather and rainfall pattern during the coming season. Sales of pesticides vary directly with the outbreak and seriousness of insect infestations rather than with the movements of the business cycle, and serious outbreaks can happen in time of recession as readily as in a boom period. As a matter of fact advance indications for the '58 season, as previewed elsewhere in this

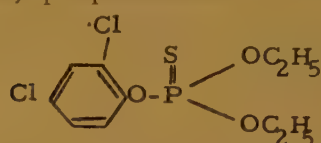
issue (pg. 56) suggest that this coming crop year could see a bigger demand for pesticides than for several years past.

Fertilizers, too, would seem to be at least partially immune to peaks and dips in the economic curve. Much more important here will be such considerations as whether contemplated removal of some of the acreage limitations may expand the fertilizer sales potential, whether possible abandonment of the soil bank may put idle acres back into cultivation once more and the effect of lowering of price support levels, if this proposal by the Secretary of Agriculture meets with Congressional approval. Whatever the net effect, there seems to be little likelihood of any serious reduction in fertilizer consumption,—which will in all probability continue at or near recent record figures, if it does not succeed in surpassing them.

WITH Federal and State pest control specialists poised to get under way with a cooperative spray program designed to eradicate the fire ant, which has become established as an extremely annoying, troublesome and destructive pest in a number of southern states over recent years, we find another New York newspaper apparently arrayed along side the *World Telegram* in its determination to harass and impede the efforts of the pest control experts. The solid, substantial and influential *New York Times*, in an editorial in its January 8th issue attacks the use of diel-drin in the fire ant control program, charging that it is highly dangerous and that because it is such a relatively new product, insufficient data are available as to the extent of hazard to fish
(Continued on Page 125)

V-C 13 Nemacide provides a new approach to chemical control of nematodes. Prior to its commercial introduction in early 1955, fumigant-type action was considered essential. Actually, the terms "soil fumigation" and "chemical nematode control" had become synonymous. V-C 13 does not exert a fumigant-type action. It does not have the high vapor pressure previously thought necessary. Yet, it has given effective control of species of at least 10 genera of the known plant-parasitic nematodes. These have been both ecto- and endo- type nematodes. It has not been active against cyst nematodes.

The active component of V-C 13 Nemacide is 0-2,4-dichlorophenyl 0,0-diethyl phosphorothioate:



The early investigations of the nematocidal activity of this compound were made possible through the cooperation of Dr. J. R. Christie and Mr V. G. Perry of the USDA in Sanford, Florida.

The product is formulated as a 75% emulsifiable concentrate. It is a dark, amber-colored, slightly viscous liquid and possesses an odor somewhat similar to parathion. Its density is n_D^{25} 1.5520 and its refractive index is d_4^{20} 1.242. The chemical stability is good and there is no turbidity. Soluble in most organic solvents, the product emulsifies readily in water to give an emulsion pH of 3.5—4. The solubility of the active ingredient in water is 0.245 mg/l at 25°C. The use of V-C 13 is described and claimed in U. S. Patent 2,761,806.

Because of its low volatility and its good chemical stability, V-C 13 does not function as a fumigant in the soil. It does not diffuse as a gas does. Consequently, it is worked into the soil by mechanical means (fork, spade, disk harrow, or rototiller) or by water movement (drench), and does not require the special equipment needed for fumigation.

*Presented at the 54th Annual Meeting of the Association of Southern Agricultural Workers, February, 1957.

Activity of VC-13 Nemacide a non-Fumigant type Nematocide

No significant phytotoxicity has been observed from the use of V-C 13. Application to turf has in some instances resulted in a temporary discoloration. Certain germinating seedlings were temporarily stunted when less than two weeks was allowed between the planting, or when more than the recommended rate was used. However, hundreds of different plant species showed negative phytotoxic results in both pre- and postplanting treatments and no permanent damage to established plants has been reported. Also, our V-C 13 studies have revealed no adverse effects on soil.

The mode of action of V-C 13 Nemacide is not completely known at this time. Both *in vivo* and *in vitro* fumigant nematocidal tests of V-C 13 and commercial fumigants definitely proved its non-fumigant action. In these tests, it failed to give satisfactory nematode control. Chemical analysis of treated soil showed its failure to diffuse. It is shown that V-C 13 gives no indication of being a systemic toxicant. Therefore, it does not control nematodes living completely imbedded within such plant parts as stems, roots, bulbs, or tubers. Furthermore, it does not re-

Results With V-C 13 on Fairway Turf in Florida¹

Treatment	<i>Rotylechus</i> spp.	<i>Hoplolaimus</i> <i>coronatus</i>	<i>Belonolaimus</i> <i>gracilis</i>	<i>Xiphe-</i> <i>nema</i>	<i>Dorylaimids</i> in general	<i>phoro</i> <i>Hemicyclie-</i>
Before Treatment						
V-C 13 drench						
15 gals/A.	4.0 ²	1.0	1.0	0	1.0	0
30 gals/A.	3.0	1.5	0.0	0	2.5	0
V-C 13 injection						
15 gals/A.	3.0	0.0	0	1.5	3.5	0
30 gals/A.	2.0	1.5	0	0	2.0	0
Check	2.5	0.5	0	0.5	3.0	0
Eight Weeks After Treatment						
V-C 13 drench						
15 gals/A.	1.7	0	0	0	0	0
30 gals/A.	1.0	0.3	0	0	0	0
V-C 13 injection						
15 gals/A.	0.5	0	0	0	0	0
30 gals/A.	0.4	0	0	0	0	0
Check	2.5	0.5	0	0	0	0

¹ Data taken from reprint: A. J. Overman, Use of Nematocides on Established Turf. The Soil Science Society of Florida Proceedings, 14: 170-173, 1954.

² Rating Index: 0. — None, 1. — 1-10 specimen. 2. — 10-100 specimen. 3. — 100-500 specimen. 4. — 500-1,000 specimen.

Results of Nematocide Trials¹ Against Root-Knot² With Squash as Test Plant

Treatment	Root-Knox Index ³
V-C 13, 10 gal/A	1.4
V-C 13, 20 gal/A	1.4
Control	3.4
L.S.D. necessary at 1% level	1.24
at 5% level	.95

¹ Trials conducted by Dr. F. Ben Struble, Oklahoma A and M College, Stillwater, Oklahoma, in 1955

² Experimental area uniformly infested with root-knot nematodes, probably *Meloidogyne incognita* and *M. incognita* var. *acrita*.

³ Based on scale 1 — 5 with 1 = no galls or injury and 5 = very severe galling.

by V. H. Young, Jr.

Research and Development Department,
Virginia-Carolina Chemical Corporation,
Richmond, Virginia

move knots or galls already on the roots. However, because of its stability, V-C 13 controls these nematodes when they leave the roots and enter the soil. This residual control allows new clean roots to develop, while the galls present at time of treatment rot and slough off, resulting in a clean-rooted plant.

Further, it is known that V-C 13 does not kill nematodes as quickly as soil fumigants. Greenhouse experiments show that at least two weeks must elapse for effective control of the root-knot nematode. If plants are planted immediately after the treatment of soil infested with endopara-

sitic nematodes, some of them may enter the plant roots without being killed. This has been demonstrated in greenhouse tests with the root-knot nematode. Several theories can be advanced on how V-C 13 effects nematode control. However, available data will only let us conclude that it interferes with the nematode's life processes in such a manner as to cause a slow death.

Toxicological data show the same need for care in handling V-C 13 as in handling other modern pesticides. The acute oral LD₅₀ for male albino rats is 270 mgs per kilogram of body weight. The acute dermal LD₅₀ for albino rabbits has been reported as approximately 6000 mgs per kilogram of body weight. It sometimes produces a mild degree of dermal irritation and should be

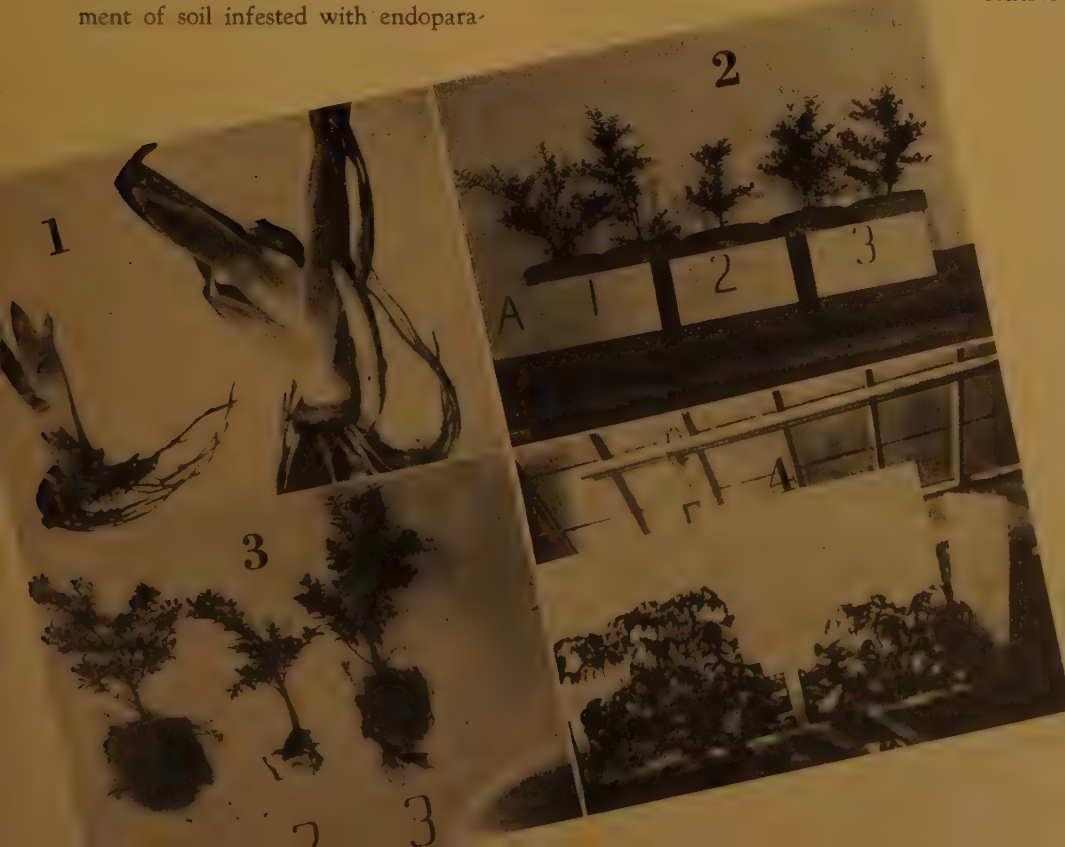
Results of Root-Knot Control on Peanuts With V-C 13 at Surry, Virginia

V-C 13 Treatment ¹	Root-Knox Larvae Per Pint of Soil
None	340.0
10 gals/A	197.5
20 gals/A	19.0
30 gals/A	12.0

¹ V-C 13 was drenched on soil surface and thoroughly disked into the upper six inches of soil two weeks prior to planting.

washed off the skin immediately with soap and water. The *in vivo* anticholinesterase activity is positive. The antidote is atropine.

V-C 13 is recommended as a pre- and post-planting treatment for general nematode control of all but the cyst forms on turf and ornamentals. It is also recommended as a pre-plant treatment for corn, cucumbers, peppers, strawberries, squash and tomatoes at an application rate of 15 gallons per acre. The FDA has accepted evidence that no significant residues will be found on these crops by this usage. The wide range of plant tolerance and ease of application make V-C 13 especially applicable to turf and greenhouse crops, and for use by nurserymen, landscape maintenance companies, and home owners. Its residual nematocidal and non-phytotoxic properties make V-C 13 a valuable addition to the growing field of pest-control chemicals.



(1) Iris rhizome on left untreated. On right, treated with V-C 13 Nemacide. Plant photographed 5 months after treatment. V-C 13 applied at rate of 1 gallon per 1600 sq. ft.

(2) *Ilex crenata convexa*. Infested soil in pots No. 1 treated with V-C 13 drench immediately after transplanting. No. 2, untreated. No. 3, infested potting soil treated with V-C 13 two weeks before transplanting. Plants photographed 13 months after treatment. V-C 13 applied at rate of 5cc per cubic foot of soil.

(3) *Ilex crenata convexa*. No. 1, root growth of plant grown in soil treated with V-C 13 two weeks prior to transplanting. No. 2, untreated. No. 3, root growth of plant treated with V-C 13 drench immediately after transplanting. Plants photographed 13 months after treatment. V-C 13 applied at rate of 5cc per cubic foot of soil.

(4) Tomato plant response to root-knot control by V-C 13; treated on left; untreated on right. Plants 25 days old. V-C 13 applied at rate of 5cc per

Northeastern Weed Control Conference

... features reports on brush control, weed control problems on crops, highway and industry

THE increasing importance of industrial and roadside weed control was evident in discussions at the annual meeting of the Northeastern Weed Control Conference, held January 8-10 at the Hotel New Yorker, New York City. Weed Control in farm crops, as usual, highlighted the sessions, but the number of reports on aquatic weed control, ragweed eradication and public health, weed control along highways and public utilities... was quite impressive.

During the business sessions, S. N. Fertig, Cornell University, was elected president to succeed C. L. Hovey, Eastern States Farmers' Exchange; L. Gordon Utter, Diamond Alkali Co., was elected vice president; and D. A. Shallock, Rutgers University was re-elected secretary-treasurer. Chairman of the program for the 1958 meeting was J. R. Havis, University of Massachusetts.

In one of the early sessions, E. M. Rahn, University of Delaware, reviewed some promising new chemicals for weed control, discussing among other materials: EPTC, Neburon, Randox, Vegadex, the isobutyrate, the propionates, and the triazines. An important feature of EPTC, he said, is its effect on nutgrass. This application was tried in the spring of 1957, with interesting results. EPTC has been found useful in pre-emergence applications on corn, soybeans, beets, and beans,—and in post emergence treatment on alfalfa. Investigations of the triazines have

shown Simazin generally effective on corn and sweet corn; Chlorazine promising on corn, beans, limas and onions; Compound 30451 promising on potatoes and tomatoes... these last two crops were found relatively tolerant to 30551, as compared with reaction to Chlorazine.

Continuing his comments, Mr. Rahn observed that researchers are enthusiastic about the use of Neburon in the nursery. This material, it is reported, offers a relatively wide margin of safety, controls chickweed (the number 1 nursery pest) by contact as well as in pre-emergence. Randox is reported promising for use on annual grasses, lima beans, snap beans, corn, soybeans and onions. Data is based on trials in New York State.

Summarizing other studies, Mr. Rahn noted that Vegadex is effective for use on seedbeds, cabbage, cauliflower, spinach, and mustard, and is promising for grass control in lettuce. Concerning the isobutyrate, FW 450 (sodium 2,3-dichloro isobutyrate) is found to have the advantage of low persistence in the soil. Of the propionates, 2,4,5-TP is reported effective in weed control of oak, maple, black locust, wild onion, garlic, and poison ivy in orchards.

Weed Control in Horticultural Crops

S. L. Dallyn, R. C. Cetas, R. L. Sawyer, R. W. Robinson, and H. H. Bryan, of the Long Island Vegetable Research Farm, collaborated in preparing a progress report on weed control in onions, corn, tomatoes and seed-beds. They reported that in

a comparison of several new herbicides including CIPC on transplanted sweet Spanish onions, the latter was found to be still the most satisfactory. Simazin is worth further study for use in lay-by applications to control grass.

In sweet corn, best weed control was obtained with Simazin. Vapam and MC-2 were very effective in seedbed weed control. EPTC was used on a variety of crops, but did not produce satisfactory control of weeds under the conditions of trial of these investigators.

Collins Veatch, West Virginia Agricultural Experiment Station, reported that under West Virginia conditions with pre-emergence or emergence sprays, full season weed control can be obtained in corn with Simazin, G 27901, Monuron or Diuron, in the absence of perennial weeds.

W. H. Lachman and L. F. Michelson, Massachusetts Agricultural Experiment Station, endorsed the superiority of Simazin in control of annual weeds in sweet corn. Sweet corn, they report, displays a wide tolerance to Simazin, and yields are not reduced even from an 8-pound application.

On tomatoes, S. L. Dallyn and associates (see above) advised that although Simazin did not appear to cause any serious injury to tomatoes when used early, where it was used late with considerable foliage contact, the plants were badly damaged. CIPC gave good control of weeds. On the other hand, Natrin and EPTC did not give sufficient weed control.

W. F. Meggitt, USDA, New Jersey Agricultural Experiment Station, advised that EPTC, 2,4,5-TES and Simazin were satisfactory, with no apparent reduction in yield of tomatoes. Neburon gave satisfactory broadleaf control, but did not control grass weeds satisfactorily. CIPC gave only fair control of weeds. CDAA provided satisfactory grass control, but unsatisfactory control of broadleaved weeds, and CDEC was not satisfactory in the control of broadleaved or grass weeds. Mr. Meggitt indicated that on the basis of yield data (although not of significant magnitude), granular formulations may be safer than aqueous sprays of the herbicides on tomatoes.

Charles J. Noll, Pennsylvania State University, presented a progress report on chemical weeding of onions, beets, spinach, sweet corn, lima beans and tomatoes, and advised that in general, chemicals found to be effective in previous years were among the best herbicides used in 1957. He reported that: For onions, CIPC looks good, with Chlorazine worthy of further investigation. For beets, Endothal-TCA combination looks good with granular Endothal, Vegadex and Radox worthy of further research. Spinach was weeded equally well by CIPC, Vegadex and Monuron, without affecting spinach stand or yield. The best three chemicals used in the experiment for weeding sweet corn were Simazin in a pre-emergence application, 2,4-D amine and Dinitro applied at time of corn emergence. Most herbicides gave only fair weed control in lima beans. The chemical G 27901 did a good weeding job as did granular Dinitro at 13 lbs. actual Dinitro per acre. Weeds were not a problem in tomatoes. Only granular Dinitro, Neburon and Vegadex at the 6 lbs. per acre rate did not, in comparison to the check plot, significantly reduce the number or weight of marketable fruits.

Weed Control in Potatoes

“AN evaluation of spray and granular applications of herbicides for weed control in potatoes after final cultivation” was offered by W. F. Meggitt, R. J. Aldrich and

J. C. Campbell, all of New Jersey. They reported that in 1956, granular formulations of DNBP, CDAA, CDT, a combination of DNBP plus CDEC, and spray treatment of Neburon, and Monuron were applied after final cultivation before weeds emerged. Dalapon and Dalapon plus 2,4-D were applied to potatoes after weeds had emerged. In 1957, EPTC, CDT, and Simazin were applied as a spray and as granular formulation. Results of the 1956 trials showed that only CDT provided satisfactory control, with no reduction in potato yields. In 1957, only fair weed control was obtained from CDT, and potato yields were reduced at higher rates when applied as a spray. Simazin at 3 pounds provided satisfactory weed control, but reduced potato yields markedly.

M. F. Trevett, C. E. Cunningham, and H. J. Murphy, Maine Agricultural Experiment Station, also reported on weed control in potatoes, advising that:



Philip Gorlin, vice chairman, Public Health Section of the Northeastern Weed Control Conference presents a certificate of merit to Alfred H. Fletcher, New Jersey Department of Health. The Certificate cites Mr. Fletcher's efforts in promoting the development of an interdepartmental committee on weed control in the State of New Jersey.

John T. Smith, county agent, York County, Pa., on the right, receives a certificate of merit for his outstanding contributions to agriculture in his county through planning and organizing better weed control practices as an integral part of the agricultural extension service program. Presenting the certificate is, Dr. L. L. Danielson, past president of the conference and chairman of the awards committee.

Herbicides that have not reduced yields of treated plants (5% level of significance) when applied to potatoes at emergence or pre-emergence are: 2, 4, or 8 pounds per acre of EPTC; 0.75, 3.0, 4.5, or 6.0 pounds of DNBP; 1 pound of Simazin; 4 or 8 pounds of CDEC; 4 or 8 pounds of CDAA; 0.6 or 1.2 pounds of Diuron, 1 to 6 pounds of Dalapon; 5 or 10 pounds of sodium, 2,3-dichloro-isobutrate (FW-450); 0.5 or 1.0 pounds of Monuron; 0.5 or 1.5 pounds of Neburon; 4 or 6 pounds of NPA.

Herbicides that have reduced yields of treated plants (5% level) when applied at emergence are: 2 or 4 pounds of Simazin; 1.5 pounds of 2,3,6-TBA.

Nursery and Ornamental Crops

INTEREST in the use of temporary soil sterilants by nurserymen, and estate, cemetery, and park gardeners, has increased, remarked R. D. Ticknor and E. C. Gasiorkiewicz, University of Massachusetts, in discussing weed control in nursery and herbaceous ornamentals. They stated that methyl bromide is most effective for weed control; Mylone and Vapam are approximately equal in effectiveness in controlling 80-90% of broadleaf weeds; chloropicrin is ineffective in controlling weeds; allyl alcohol is not satisfactory, being less than 50% effective. None of the soil sterilants tried were phytotoxic to the herbaceous ornamentals planted one week after application; phytotoxic effects were observed only in the woody ornamentals planted a week following application of chloropicrin, . . . subsequent plantings were unaffected.

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FERTILIZER PRODUCTION

Discussion from the Fertilizer Industry Round Table*,
with comments from participating speakers

About Ureaforms:

Have ureaforms been found suitable for use in formulations of complete goods — powdered? granulated?

What specific conditions should be met to assure stability of ureaforms in fertilizer mixtures?

IT is assumed that this question refers primarily to solid ureaforms, manufactured and sold as separate products. The use of materials to make ureaforms right in the mixture is taken to be outside of the scope of the present question. Yes, ureaforms have been used in formulations of complete goods, with considerable success. As far as we know, all such formulations have been for specialty fertilizers, a 10-6-4 lawn fertilizer being typical.

The mixtures known to us are mostly powdered, though sometimes a ureaform, which is somewhat granular, is mixed with a base that has been granulated separately. We know of no case in which a solid ureaform is added to the mixture of ingredients before granulation.

It is assumed the term "stability" as applied to ureaforms means that the product does not react so far that the nitrogen becomes unavailable. To assure such stability, it is best to avoid hot, moist storage, as well as high acidity. Just to illustrate the effect of temperature, a fertilizer, approximately 10-10-11, was made in the laboratory by adding a good solid ureaform to a previously made base, so that three units of nitrogen came from the ureaform. A high A. I. was found for the water-insoluble nitrogen in the mixture, namely 64%. After one month at room temperature, the A. I. was 54, and the same value was found

seven months later. After a month at 50° C. (122° F.), the A. I. had fallen to 24 and after 7 months more at this temperature it was only 12. Rather surprisingly, during storage for eight months the cold-water-insoluble nitrogen increased by only 0.2 unit.—C. E. Waters**

GENERAL DISCUSSION: Under the usual conditions of fertilizer man-

ufacture, ureaform would be relatively stable. No nitrogen losses are likely in the urea, except perhaps by hydrolysis . . . and there is not much room for hydrolysis in the general mode of operations.

In the course of granulating fertilizer, high temperatures exist for short periods, and minor hydrolysis occurs in some grades of fertilizer.

Has the accepted Availability Index (A. I.) method for predicting the response of ureaforms been found satisfactory when applied to ureaforms in mixed fertilizers?

STRICT interpretation of the note, "Applicable to urea-formaldehyde compounds only," in the book of "Official Methods of Analysis of the A.O.A.C." would not allow the application of the A. I. test to mixed fertilizers. However, the phrase might be construed to permit the testing of mixed fertilizers in which ureaform is the only source of water-insoluble nitrogen. Although the collaborative test run by the A.O.A.C. included no such product, the original presentation by Morgan and Kralovec included data on mixed fertilizers, one of which contained only 6% water-insoluble nitrogen.

The size of sample required for the determination of hot-water-insolu-

ble nitrogen can cause serious difficulty. This sample must contain 0.3 gram of water-insoluble nitrogen (W.I.N.). If the fertilizer analyzes 3% W.I.N., a 10-gram sample is required, and this is quite manageable. If only 1% W.I.N. is present, a 30-gram sample must be taken, and this is hard to handle. Besides, it may seriously change the pH of the buffer solution.

We have only scanty information as to the actual use of the A. I. test by industrial and governmental laboratories in analyzing mixed fertilizers. There is also little or no information on the correlation between

*Fertilizer Industry Round Table held in Washington, D. C. Oct. 1, 1957.

**Nitrogen Division, Allied Chemical & Dye Corp.

A. I. tests on mixed fertilizers and actual response of plants to the nitrogen contained in them.

At present there is no accepted method for testing mixed fertilizers containing both ureaform and natural organics. The A.O.A.C. neutral permanganate method is used to some extent for want of a better one, but some chemists hold it to be unreliable.

In some cases there is also substantial interest in distinguishing between the part of the water-soluble organic nitrogen that represents free urea, and that which represents water-soluble reaction products of urea and formaldehyde. A separate determination of free urea nitrogen by the urease procedure is helpful in such cases.

—C. E. Waters.

The TVA Cone Mixer:

A discussion of its advantages and disadvantages

WHEN any cone mixer is installed, whether it is put on an existing den or on a completely new den, the normal problems of rock handling and measuring and liquid control will appear. These usually present very small problems that are easily solved.

Early cone designs allowed only a very narrow rate of operating range, usually in the neighborhood of from flooding rate to a rate of feed of 5% less than flooding. Any reduction in rate beyond that would not give proper mixing. Modern cones, how-

ever, have good mixing with operating ranges from flooding to approximately 50% of flooding.

The use of strong acids presents a problem in operating the cone. Heat of dilution raises the temperature high enough in the cone to cause large quantities of steam to be evolved. While this steam could certainly be controlled with proper fume hoods, the operator's visibility in the cone is greatly reduced. Uniform results are not as easy to obtain with 93% or 98% acid as with 78% acid.

The life of the cone liner is quite

variable. A liner made of 10 gauge mild steel is normally expected to last between 20,000 to 40,000 tons when used on a box or continuous den. On Sturtevant type dens, we expect the mild steel liner to last 5,000 to 10,000 tons. Starting and stopping the cone is much more damaging to it than operating. In order to improve the start-stop life of a cone liner, we are experimenting with liners that have been Teflon lined, lead lined, coated with various Epoxy compounds, liners that are made entirely with reinforced plastics and various rubber coatings for steel cones. We are hoping to find a cone coating that will allow us to reach a 100,000 ton life for the liner under all conditions.

When a given quantity of acid, water and phosphate rock are mixed together, no matter what means of mixing is used, substantially the same end product, as far as analysis goes, will result. The cone gives some advantages over pan type mixing in that mixing techniques will always be the same. The time going through the cone is always the same. In cones, all of the gases are evolved from the

(Continued on Page 127)

1. *Advantages.* To realize fully the advantages of a cone mixer, the cone should be engineered by someone who has a record of experience with cone mixers. The cone mixer has the following advantages in comparison with any other type of mixer:

- (a) Less initial equipment investment.
- (b) A lower investment for structural supports and installation.
- (c) No operating power for mixing.
- (d) Exceptionally low maintenance.
- (e) No moving parts.
- (f) Small space requirements.

In common with other types of continuous mixtures, the cone has the following advantages over a batch mixer:

- (g) Less personnel required for operation.
- (h) Fume recovery is better using the exhaust system designed for a given tonnage batch system.
- (i) Acid can be diluted over a substantial range within the mixer. However, 66° acid should not be diluted within the mixer as some operators have found out to their sorrow.

2. *Drawbacks.* Some of the drawbacks are those associated with any continuous mixer. These are:

- (a) Feeder calibrations must be made accurately and checked periodically.

- (b) The entire ground rock system must be engineered to prevent flooding.

- (c) Some spent acids may be difficult to meter properly on a continuous basis.

Some drawbacks are inherent with the cone, and the seriousness of these drawbacks depends upon the type of den used with the mixer.

- (d) The cone is not amenable to wide variations in rock-acid proportions.

- (e) The cone requires a fluid discharge and mixing is hindered as net acid concentration is increased.

- (f) Maintenance is a function of stop and start operation because of acid drip from the nozzles. Less maintenance per ton is required when the cone is used with box or continuous dens than when it is used with Sturtevant dens.

- (g) The cone is so simple that apparently anyone should be able to build his own cone. However, there are certain nozzle sizes and cone dimensions that must be used over a given range of tonnage if good results are to be obtained. The ability of amateurs to build their own cones is a drawback if their unsatisfactory results cast doubt as to the efficiency of the cone mixer in general.

F. T. Nielsson

PEST-O-Rama . . . A cooperative presentation of the Alabama Association for the Control of Economic Pests and the Alabama Polytechnic Institute . . . brought together industry, dealers, distributors, county agents, extension representatives and the general public in a combination trade show — technical session on pest control measures, with a county fair atmosphere. Attendance was in the thousands, as Alabamians and visitors proved they were interested in learning how they can fight pests . . . crop and garden enemies . . . with modern chemicals, methods, and equipment.

Pest-o-rama was held January 19-21 at the Alabama State Coliseum . . . featured commercial exhibits, industry films, demonstrations of new equipment and pest control operations. Ladies were entertained with a fashion show, flower arrangement demonstration, tour of the city and music by the Auburn Concert Band. Pest-o-rama was designed to hold the interest of groups with varying degrees of knowledge and interest in the agricultural chemicals industry.

The formal session of the meeting was opened with an address by AACEP president, George Williamson, of the Agricultural Chemical Service Co., Montgomery. He reviewed some of the work done by the association, and stated the general intention of Pest-o-rama.

In his comments, Mr. Williamson said, "We invite the Alabama farmers to come to this show and learn how they can fight the pests and diseases that are eating holes in their annual earnings. You can make money by attending this show, because the show is designed to make you money."

The conference and trade show presented by the AACEP and the API was the result of considerable effort by members of both organizations. The concept seems to trace back to some early planning and organizing by Robert Smith, Jr., of American Cyanamid Co., Montgomery — following which George Williamson, president of AACEP heartily endorsed the idea and Pest-o-rama was on its way.

ALABAMA PESTORAMA

It is difficult, its participants agree, to recognize the many groups and individuals who made the meeting a success. Listed below, however, are some of the committee chairmen for this first Pest-o-rama:

PROGRAM: G. H. Blake, Jr. and
U. L. Diener

PUBLICITY: R. J. Smith, Jr.

LOCAL ARRANGEMENTS: Norman Downey

ATTENDANCE: W. A. Ruffin

EDUCATION EXHIBITS: F. S. Arant

BOOK DISPLAY: B. W. Arthur

ADVERTISING SALES: R. J. Smith, Jr.

LADIES ACTIVITIES: Miss Carol Lollar

Pests and Pest Control

IN the pest control discussions, K. L. Hays, Alabama Farm Bureau Federation, reported on the imported fire ant, its life history and control. He stated that the pest originally came to Mobile in 1918 from South America, was first authentically identified in 1930, and recognized as an economic pest in 1935, following damage to seedling corn. A control program was started in 1937, by treating some 2000 acres of corn with HCN. Current control measures . . . all of which are equally effective . . . include the following chemical appli-

cations of actual material per acre: 4 lbs. chlordane, 2 lbs. dieldrin, or 2 lbs. heptachlor. "Eradication is theoretically possible," observed Mr. Hays, "If every foot of infested land is treated."

Some of the hazards in control programs against the fire ant, he indicated, are:

Danger of the chemicals to fish, game, and bees.

Contamination of drinking water.

Upsetting the biological balance of nature.

Contamination of milk (cows eating treated forage).

Pest-o-rama visitors were particularly interested in Mr. Hays' comments, since several areas in Alabama are about to be dusted with heptachlor (by air) in the Federal-State program against the fire ant.

The Pesticide Product

AN address on the "perplexing hurdles in developing agricultural chemicals" was prepared for the Pest-o-rama meeting by Jack V. Vernon, president of NAC, and president of the Niagara Chemical Division of FMG. Mr. Vernon, due to illness, however, did not attend the meeting, and his address was presented by Charles Zorsch, of Monsanto Chemical Co., St. Louis. Excerpts from Mr. Vernon's report follow:

"It is generally accepted that a new pesticide product developed in the laboratories of our industry, from inception to readiness for use, costs around \$1,000,000. Some cost more, some less . . . but here again we have risk capital. The product, if it is good for agricultural purposes, has a

attracts: dealers
county agents
formulators
distributors
housewives
farmers



Photo by Stevenson, A.P.I.

Newly elected officers of API: (seated) retiring president, George Williamson, Agricultural Chemical Service Co.; newly elected president, B. P. Livingston, Alabama Department of Agriculture and Industries; newly elected vice-president, Norman Downey, Hercules Powder Co. (Standing) elected to the board of directors: Robert Smith, American Cyanamid Co., and re-elected secretary-treasurer W. G. Eden, Alabama Polytechnic Institute.

Another newly elected member of the board of directors is John Cook, Cook's Pest Control Co., who is not shown in the picture.

chance to succeed, and you can hope to recover the research dollars spent, provided its life usefulness is long enough to permit its manufacture and sale in sufficient quantities,—and at a good enough profit return. If, however, resistance builds up quickly by the insect to be destroyed, you can readily understand how hopeless can become the chances of recovery of the risk capital, to say nothing of a decent return on the investment. This is one of the perplexing hurdles, and is causing great concern in our industry on just how far we can go with research expenditures in the face of the very high hurdles that must be cleared satisfactorily.

"Another aspect is the development of toxicity data on which residual tolerances may be established so that safe uses of pesticides may be prescribed and directed. This is expensive and time-consuming.

"Another aspect is legislation both federal and state. I'd like to point out that the industry and the NAC have a record of supporting sound legislation . . . but we vigorously oppose restrictive legislation which would increase costs to, or would be injurious to those we serve . . . the farmers who are our end-use customers.

"There has been much talk recently about resistance. That there is resistance has been scientifically proved in some instances. However, we feel that the resistance problem is being magnified and publicized out of all proportion, and that it now offers a hideaway for any failure in pest control due to poor application, poor

timing, poor choice of materials, etc. While the problem of resistance should not be minimized, nevertheless, it should not be exaggerated. A study of its economic importance is needed.

"There has been a degree of confusion toward special label requirements on a state basis. We are opposed to this requirement. Special labeling greatly increases the cost to pesticide consumers, since the expense of compliance with these requirements is usually passed on to the user of these products. Special labeling restrictions might also make it legally impossible to meet the demand for pesticides in some instances where emergency measures of protection would require shipment from one state to another.

"As pointed out previously, the pesticide industry has a record of supporting sound control legislation. Our industry assumes the burden and costs of most of the research registration and other costs due to regulations to assure that the farmer gets a good product. Present legislation is fully adequate to keep off the market inferior products which will not effectively control the pests for which they are recommended and sold. Simplification is not necessary to insure that the grower receives a good product at a fair price.

"Enforced simplification would interfere with the rights of the manufacturer to sell and the rights of the buyer to select a product he wishes from a number of effective materials. We recognize that there are valid reasons for one state recommending a certain product while another does not. However, we do object to regulatory proposals which would arbitrarily limit the manner and kind of formulations which could be sold and used for a specific pest control program."

58 Cotton Pest Control

F. S. Arant, API entomologist, remarked that in recent years, there has been a great deal of confusion about the boll weevil becoming resistant to chlorinated hydrocarbon insecticides. "To date," he said, "all boll weevils tested in the state of Alabama have been found susceptible to the chlorinated hydrocarbon insecticides, and can therefore be controlled successfully with these compounds. However, as the season progresses, the boll weevil becomes harder to kill. This fact has been known for many years prior to resistance problems. Late in the season, the amount of insecticide applied, regardless of the material used, must be increased for satisfactory control. This is true because of

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PLANT

G R O W T H

RECENT studies of the effects of gibberellic acid on plant growth and development carried on by the Agricultural Research Service of the U. S. Department of Agriculture are described in a report prepared by Paul C. Marth and Bernard C. Smale of the Crops Research Division, Agricultural Research Service, USDA, Beltsville, Md. Some of the effects reported, such as suppressed root growth, chlorosis in young, rapidly growing plants, and an increased susceptibility to frost injury, indicate that gibberellic acid has unfavorable as well as favorable effects on plants.

Early experimental work with gibberellic acid by U. S. D. A. research workers was aimed primarily at determining whether plants in general would respond to this compound. Over 60 genera, species, and varieties of agronomic, forest or horticultural plants grown in soil in the greenhouse were included in the study. Most of them responded in some way. Variations in the responsiveness of different varieties of a given crop plant also were noted. The overall result of the work showed that gibberellic acid will probably affect the growth and development of most plants.

British workers back in 1955 had reported an increase in dry weight of wheat and other plants grown in nutrient solutions to which gibberellic acid was added. In three experiments by U. S. D. A. personnel at Beltsville with soybeans and with pinto beans under greenhouse conditions, the treated plants were 21 to 32 per cent heavier than untreated ones during the early stages of growth. As the plants

became progressively more pot bound, however, the differences in dry weight decreased, and after two to three weeks there were no detectable differences.

On most plants the first detectable effect of gibberellic acid is rapid elongation of the stems. Young pinto bean plants and other young succulent plants, when grown under greenhouse conditions, showed a measurable response within 24 hours after they had been sprayed with 0.01 ppm of the acid. For many kinds of the woody plants, however, a concentration of 100 ppm or greater was required.

In other studies it became apparent that a more rapid stem growth could be anticipated from gibberellic acid applications to relatively young plants with well-developed root systems and with adequate food reserves in their leaves and stems than in plants with undeveloped root systems and limited food reserves. In addition, maximum response may depend upon an adequate supply of nutrients and water in the soil along with optimum light.

Because chlorophyll production apparently does not keep pace with the stepped-up rate of cell elongation and other growth, the treatment of young, rapidly growing plants, it was found, may result in mild to severe chlorosis. On the basis of visual estimations, the intensity of green color in several kinds of plants treated with gibberellic acid appeared noticeably reduced compared with that of comparable untreated plants. Application of mineral nutrients to the soil largely

corrected the chlorotic effects induced by gibberellic acid. In preliminary experiments with pinto bean plants, the addition of varying amounts of urea to gibberellic acid spray mixtures did not counteract this chlorosis. Applications of urea to the soil in which the treated plants were growing, likewise, was not effective in reducing the chlorosis.

On some kinds of plants (citrus, willow oak, and snapdragon) lateral bud dormancy caused by apical dominance was lessened following application of gibberellic acid, and more lateral branches were produced in treated plants than in untreated ones. In these experiments it was not possible to directly initiate flower bud development as a result of gibberellic acid treatment; although flowers were produced on one sugar beet plant out of ten in one experiment.

On the basis of work to date, it appears that gibberellic acid may be expected to influence dormancy caused by some, but not all, physiological processes. In limited experiments under greenhouse conditions with dormant willow oak trees that had been subjected to some cold out-of-doors prior to January, the gibberellic acid-treated plants developed new shoots about two weeks earlier than the untreated plants.

According to results obtained at Beltsville, gibberellic acid has an effect on flower production, but it may be an indirect one brought about by altering the overall growth habit of the various kinds of plants studied. When young sweet peppers were treated they developed excessive vegetative

the effects of gibberellic acid

growth as compared with untreated plants and flowered one month later. Some other plants produced an abundance of flower buds, but many of these failed to develop beyond the tiny, but visible bud stage.

Gibberellic acid suppressed root growth of several kinds of plants. Even though the dry weights of tops of pinto beans and soybeans treated with the acid and grown under greenhouse conditions increased five to 35 per cent over those of untreated ones, the dry weight of roots decreased nine to 19 per cent. A similar lack of root growth was noted in the case of treated citrus seedlings. Marked suppression of root induction and growth was noted in preliminary experiments with cuttings of geranium, rose, Pfitzer juniper, privet, and firethorn, to which 10 and 100 ppm of the acid was applied.

Further evidence that gibberellic acid inhibited root induction and root growth was obtained in an experiment with hydrangia cuttings. Separate lots of cuttings were treated with gibberellic acid, indolebutyric acid or with a combination of both of these acids. Not only did gibberellic acid suppress root initiation but it apparently resulted in a reduction of the ability of the cuttings to respond to the root-inducing chemical, indolebutyric acid.

Celery and English boxwood plants treated with gibberellic acid were much more susceptible to frost injury than untreated ones, when subjected out-of-doors to winter temperatures. Celery plants treated with acid in the field became taller and at the end of the summer contained 25 to 40 per cent more moisture than the untreated plants.

Messrs. Marth and Smale conclude with the observation that, "There will no doubt be disappointments and failures in finding how best to use gibberellic acid. . . . In our enthusiasm we often forget that each individual plant species has its own specific chemical factory. We must let the plants tell us how gibberellic acid can fit into their manner of growth and thus be used to best advantage."★★

U. S. D. A.

research workers emphasize

there are unfavorable as well as favorable

responses to applications of

gibberellic acid

Trade Listing

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California Weed Conference

SOME 425 farmers, agricultural authorities, state and federal research workers and representatives of basic producers and formulators of Agricultural Chemicals met in San Jose, California, January 21, 22 and 23 for the 10th Annual California Weed Conference. New officers elected for the ensuing year were J. T. Vedder, Sunland Industries, Fresno, President; Bruce Wade, Shasta County Department of Agriculture, Vice-President; Jim McHenry, Botany Department, University of California, Davis, Secretary, and Boysie Day, Citrus Experiment Station, University of California, Riverside, Treasurer. The group will meet in Santa Barbara for their next meeting January 20, 21, 22, 1959.

Lead off speaker R. H. Beatty, American Chemical Paint Co., Ambler, Pa. told members that "Progress in the herbicide field has been rapid and varied during the past 10 years." This activity was triggered by the development and early use of 2,4-D. Beatty paid tribute to the cooperative work between state, federal, industry, and private individuals responsible for putting this and similar materials into wide-spread use. It was 10 years ago that "low-gallage" was first discussed, and used in the field. Today this type of application makes possible herbicide usage on more than 30 million acres. As our understanding of the mode of action of herbicides increases, we are able to go from a haphazard approach in the use of chemicals to a more intelligent one where the compound can be completely evaluated. The formulation of products is undergoing some changes. Beatty mentioned work done with an "invert emulsion" where the product is similar to thick cream, with the oil on the outside of the water. This type of product would be much less susceptible to drift and users could see where applications had been made.

By Charles Starker

Chief areas for such a product would be on woody plants," Beatty concluded.

New Chemicals

A panel discussion "What is New in Weed Control?", chaired by Dr. G. F. McLeod, Sunland Industries, Fresno, created a great deal of interest among those in attendance. Dr. K. S. Maxwell, Monsanto Chemical Co., Santa Clara, Calif. discussed briefly the use of Randox in the mid-west for pre-emergent annual grass control in corn; and Vegadex, which was used this past year in several areas for control of annual grasses and broad-leaved weeds in vegetable crops. Both of these materials are registered federally and for use in California. Graham Randall, Stauffer Chemical Co., Mt. View, Calif. reported on "Eptan" (EPTC) a new pre-emergent herbicide which has been effective against all grasses tested. Rates of 1 to 5 pounds per acre will control watergrass, annual blue grass, Johnson grass, wild oats and Medusae head rye. With higher rates it is effective as a pre-emergence herbicide on many broad leaved weeds. It has suppressed both species of nut grass for a 6 to 10 week period. It will be formulated as an emulsion concentrate and a 5% granular material. Alan Hoaglund, Phosphates and Nitrogen Division, American Cyanamid Company, Los Angeles discussed band application of Aero Cyanamid, granular. This is applied in bands of 5, 6 or 7 inches width over the crop row, at rates of 500 to 700 lbs per acre.

R. A. Fosse, American Chemical Paint Co., Denver, Colo. reported on Polychlor benzoic acid and 2,3,6 Trichloro benzoic acid (TCB) formulations. Amine formulations of these will be available in 1958 for use against perennial weeds such as morn-

ing glory and Russian knapweed on non-crop land.

G. D. Hill, E. I. du Pont de Nemours & Co., discussed Neburon and Phenuron, which are now commercially available as Karmex N and Karmex F P respectively, Karmex N, available as an 18.5% wettable, is currently registered for use on ornamentals, with promising trials on tomatoes, strawberries, and certain other crops. Karmex F P is formulated as a 25% pelleted product, effective against post oak, black oak, and winged elm.

Lin Harris, Chipman Chemical Co., Portland, Oregon, mentioned a new pelleted formulation of Chlorea, containing sodium chlorate, sodium meta borate and Telvar. The product is readily applied by cyclone spreaders or similar means.

J. P. Corkins, Naugatuck Chemical Division, U. S. Rubber Co., Los Angeles, discussed experimental herbicide 3Y9, which is similar to 2,4-D in composition. In preliminary evaluation it has been found effective against a wide range of broad-leaved weeds and annual grasses when used as a pre-emergent material. High rates have given soil sterility. It has been used in sugar beets, sweet potatoes, asparagus, sweet corn and field corn, and appears promising for chemical summer fallow on small grain crops.

Ray Daehnert, General Chemical Company, Los Angeles, reported on HCA, a material which enhances the activity of diesel or aromatic weed oils. It has been effective on both Bermuda and Johnson grass, as well as certain other grasses. It is registered federally and for use in California. Urox is a granular monuron chloro acetate for dry application to the soil surface. This is also registered federally and for use in California on railroad rights of way, oil tank farms, and in similar non-crop areas.

(Turn to Page 120)

A Study Of

FERTILIZER BUYING HABITS

THE first installment of a marketing study conducted last spring for the Nitrogen Division, Allied Chemical & Dye Corp., New York, by National Analysts, Inc., Philadelphia, on the marketing of fertilizers in the Midwest was published by the Nitrogen Division last month.

Almost 400 farmers, who were interviewed in Michigan, Illinois, Indiana, and Ohio, provided answers to fifty questions about the buying of fertilizer. The questions covered all phases of crop production and were aimed at finding out what factors control a farmer's decisions when purchasing fertilizers.

The survey shows that the decision of a farmer to buy fertilizer usually comes in the spring, but 78 per cent of the farmers do not buy all their fertilizer at one time. Those who do buy all their fertilizer at one time do so because they get a more favorable price, it is convenient to get it all over with at once, and some of them use their fertilizer all at one time. Farmers have a variety of reason for not buying all their fertilizer at one time. Among them are lack of adequate storage space, uncertainty as to quantity needed, and the ease of handling the smaller amounts which are purchased as they are needed.

There tends to be little shopping around from one dealer to another. This is traceable to dealer loyalty and the belief that there are no real price differences for the same quality of material. When the farmer does shop around, it is mainly in search of a price advantage, according to 93 per cent of those questioned. Very few farmers believe that there is any difference between fertilizers of dif-

Nitrogen Division Surveys 400 Farmers in Midwest . . . Decision on What to Buy Normally Comes in the Spring, But 78% of Farmers Surveyed Do Not Buy All Their Fertilizer At One Time.

ferent manufacturers which are of the same form and analysis.

Fifty-seven per cent of farmers turn to fertilizer dealers or salesmen for information about a particular type, analysis, or brand of fertilizer. Thirty per cent seek information from their county agent or other agricultural officials. The brand name of a fertilizer is seldom mentioned in these discussions. Farm magazines and state farm papers are the primary mass media source of information.

Those who seek information about a particular fertilizer do so to help solve a specific problem, 57 per cent, or out of curiosity, 30 per cent.

When it comes to the cost of a fertilizer, 24 per cent said they would be more likely to buy a more expensive brand rather than a cheaper one. Eighty-four per cent of this group said that they are skeptical of cheap fertilizers and feel that good fertilizers are not cheap. Sixty-six per cent of the farmers who said they would buy the cheaper of two fertilizers said they would do so to save money, while 43 per cent do not feel that there would be any difference between fertilizers of slightly different prices.

Sixty-six per cent of the farmers who reported having had bad experiences in using a particular fertilizer felt that the manufacturer was at fault.

Almost half of the farmers questioned, 46 per cent, did not discuss their fertilizer needs with any-

one the last time they purchased a fertilizer or fertilizer material. Twenty-nine per cent talked it over with their dealer. The most mentioned topics in discussions of fertilizer needs were price, analysis type, and the amount needed. In only one per cent of the cases where a farmer talked over his fertilizer needs with someone did he decide not to buy as the result of the discussion.

Corn led the list of crops fertilized in the Midwest during the past crop year, with 88 per cent of the farmers questioned listing it among their most important fertilized crops. Sixty-eight per cent listed wheat and 42 per cent named oats. These crops are followed in importance by soy beans, hay, truck crops, small fruits and berries, tree fruits, and grain sorghum in that order.

The most popular analysis and type of fertilizer used for corn was 12 12 12. It was used by 54 per cent of farmers, 37 per cent of whom used it as a starter. Fertilizer with the same analysis also was used on wheat by a large majority of farmers and on oats by the largest percentage. For soybeans, however, 5 20 20 was the most popular fertilizer. It was used by 26 per cent. Twenty-two per cent used 4 16 16 and twenty per cent used 0 20 20. On hay, 0 20 20 was used by 41 per cent of farmers and was followed by 12 12 12, used by 29 per cent. Truck crops received 5 20 20 fertilizer from 41

(Turn to Page 122)

SOLVING production problems of the fertilizer mixer is the main operation of a newly-constructed Mixed Fertilizer Demonstration Plant at Spencer Chemical Company's Jayhawk Works in Kansas City, Mo.

Operation of the plant, a conventionally equipped, ammoniator-granulator set-up on a "pilot" scale has been under the direction of the company's technical department since last June. Completed in February of last year, the plant was "checked out" by Spencer's Research and Development Division and then turned over to the technical department for the study of mixer problems.

"We're trying to develop as much 'know-how' as possible about solving common mixer problems," says Ralph Miller, head of the company's technical department. "Producing high analysis mixed goods with conventional equipment is of course, a problem which many mixers are tackling now or may soon have to tackle. Some of the answers we're trying to develop on this include: Production costs, using various available raw materials, formulas, production rates with standard equipment and physical properties of the finished material. "We even go so far as to run storage tests to check mechanical condition," Mr. Miller says. Among the ratios which are being studied with a view toward learning how they can profitably be increased to the so-called "high" analysis level are: 1-1-1, 1-4-4, 1-1-0 and 1-4-0.

The word "demonstration" in the unit's title means just that. "Being able to show a mixer how to do it is

much more effective than writing or telling him how to do it," says W. A. McPherson, project chemist at the unit. Spencer has indicated that it intends to make broad distribution of all information on improved processing techniques and data just as soon as they are proven to be valuable on a commercial scale.

A promising development from the work at the Mixed Fertilizer Demonstration Unit is the effort to solve the sparger corrosion problem. According to Mr. Miller, "The work to develop a better sparger has been almost a full-time project involving

left—This building at Spencer Chemical Company's Jayhawk Works near Pittsburg, Kansas is a mixed fertilizer "laboratory." Called the Mixed Fertilizer Demonstration Unit, it contains conventional fertilizer mixing equipment on a small or "pilot" scale.

right—A comparison of the effects on two steel test plates of an ammoniating solution containing a corrosion inhibitor (dull plate at bottom) and one which did not have an inhibitor (shiny plate at top). These plates were used in Spencer Chemical Company's corrosion testing laboratory as part of the company's program to develop more effective corrosion inhibitors.

Technical Service

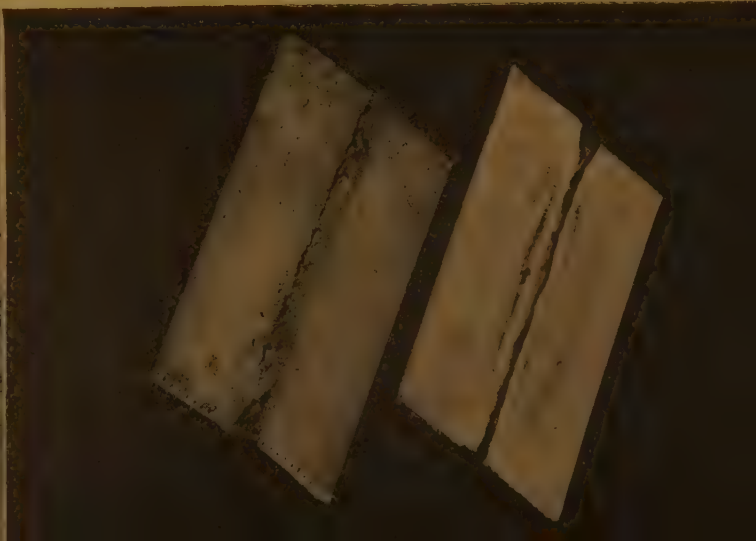
everything from metallurgical studies to engineering design. We now have what we think is not only an improved sparger from the standpoint of corrosion resistance, but a design which will give better distribution." Test results with the new sparger have been encouraging so far.

In other phases of the work at the demonstration unit, headway has been made in granulating "troublesome" grades such as 5-20-20 and 6-24-12. Data is also being accumulated on the use of phosphoric acid in granulation. How best to lick the fume "nuisance" plaguing the industry has also been studied at the demonstration unit and word is awaited on the commercial evaluation of a fume removal unit developed there.

The Corrosion Problem

SPENCER feels it may have solved some of the corrosion "headaches" of mixed fertilizer manufacturers with a new line of ammoniating solutions.

Significant reduction in the corrosion caused by these solutions is be-



by Demonstration

at Spencer Jayhawk Works

ing claimed by Spencer in introducing "Spensol Green." The new line of solutions contains an improved inhibitor which will show definite advantages in cutting corrosion and prolonging the life of conventional steel equipment. J. C. Denton, agricultural chemicals vice president for the chemical company says: "We think that "Spensol Green" solutions represent a big step toward better ammoniating solutions for the fertilizer mixer.

Actually this is the first really new solution development for the past 10 years. We believe that it will result in measurable decreases in equipment replacement and profits lost through enforced 'down-time' due to corrosion failure."

Laboratory tests so far have indicated that the inhibitor used in the new solutions results in at least 40 per cent less corrosion than any of the more than 150 inhibitors being tested.

This includes the inhibitor being used in "Spensol" solutions up until the introduction of "Spensol."

The 40 per cent less corrosion indicated with "Spensol Green" cannot be directly interpreted to mean 40 per cent longer service for equipment in which it is used. Ralph Miller, technical director for Spencer explains it this way: "Any piece of equipment is only as strong as its weakest link," he says, "And, in most cases, we have found that the 'weak' link, or place most quickly and vigorously attacked by solution corrosion is the weld bead. If a solution eats through a weld in a tank it makes little difference what condition the rest of the metal is in—the tank is useless." On the basis of corrosion tests, we know that "Spensol Green" is at least 40 per cent more effective in reducing corrosion than any additive we have tested during 12 years of additive research.

"Of course," Mr. Miller says, "even with "Spensol Green" we are not discounting importance of tolerance control in the effectiveness of an inhibitor. We know that close control of the amount of inhibitor added, which means testing every car shipped, really pays off in making the inhibitor effective."

Users of the new ammoniating solutions will have to have a visible metering device to prove to themselves that the new solutions do have a definite green color. "Spensol Green's" color will not affect the color of the finished product but, according to Mr. Miller, "We definitely expect it to help prolong the life of conventional steel tanks, dip pipes, lines and spargers."★★

left—Stitching up a bag of mixed fertilizer, a technician at Spencer Chemical Company's Mixed Fertilizer Demonstration Unit prepares to store the material to check its mechanical condition.

right—Technicians at Spencer Chemical Company's Mixed Fertilizer Demonstration Unit prepare to change a shaker screen. The demonstration unit, actually a conventional ammoniator-granulator set-up on a "pilot" scale is equipped to produce any analysis that is chemically feasible, using commercially available raw materials. Here, studies are made to develop improved processing information for distribution to the mixed fertilizer industry.



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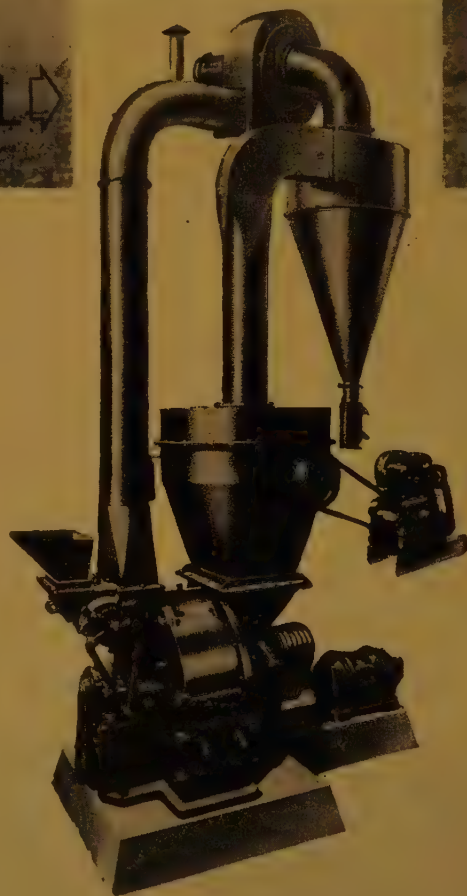
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Liquid Fertilizers

advice on formulation at Sohio Symposium

SOHIO Chemical Company introduced the first of two new illustrated handbooks, designed to aid the manufacturer of liquid fertilizer, at a symposium held January 18th at its Lima, Ohio, plant, and attended by some 150 liquid fertilizer manufacturers. The manual, "Sohio Nitrogen Solutions," tells how Sohio's nitrogen solutions can be employed in the manufacture of liquid fertilizer. A second manual will be available shortly covering in considerable detail the use of "Sohiogen" nitrogen solutions in the manufacture of dry fertilizers. It will cover a wide variety of problems and processes involving the use of nitrogen solutions in fertilizer manufacture, including granulation as opposed to conventional mixing, formulation, calculations, cost analysis, handling of nitrogen solutions, safety, etc.

The session at the Lima plant was opened with an address by E. F. Morrill, president of Sohio Chemical Co., who told his audience that Sohio decided to go into the petrochemical

field because of a desire to diversify its operations and to upgrade its raw materials. They chose nitrogen as a most logical petrochemical product to manufacture because "as farm land grows older, it requires increasing applications of fertilizer to remain productive. This fact, coupled with estimates of population increases, paints a picture of a limitless future for synthetic nitrogen chemicals," Sohio's entrance into the manufacture of ammonia, he concluded, guarantees "an assured supply of nitrogen materials to fertilizer manufacturers in the Central Eastern states at a reasonable cost, and ready availability of the necessary solutions and technical service that are required in the manufacture of higher-analysis fertilizers."

A talk followed by H. J. Coleman, Sohio's sales manager, on the background of what his company has done in supplying nitrogen to the fertilizer industry for the manufacture of both dry and liquid products. C. M. Phinney, formerly Sohio's tech-

The fertilizer industry's most modern methods of manufacturing ammonia, urea and nitrogen solutions are incorporated into Sohio's plant at Lima, Ohio.

nical service representative and now a liquid fertilizer manufacturer himself, discussed the problems of liquid fertilizer manufacture as presented to Sohio by the industry. Sylvester Grant, currently Sohio's technical service representative and formerly with the sales service and development laboratory, explained the type and scope of work carried out in the interests of the industry in Sohio's laboratories. H. H. Tucker, Sohio's agricultural service director, in the principal presentation covered in a slide-illustrated talk, the results of Sohio's intensive laboratory work in the area of determining the effect of varying combinations of urea and ammonium nitrate on the solubility of the fertilizer manufacturers' product.

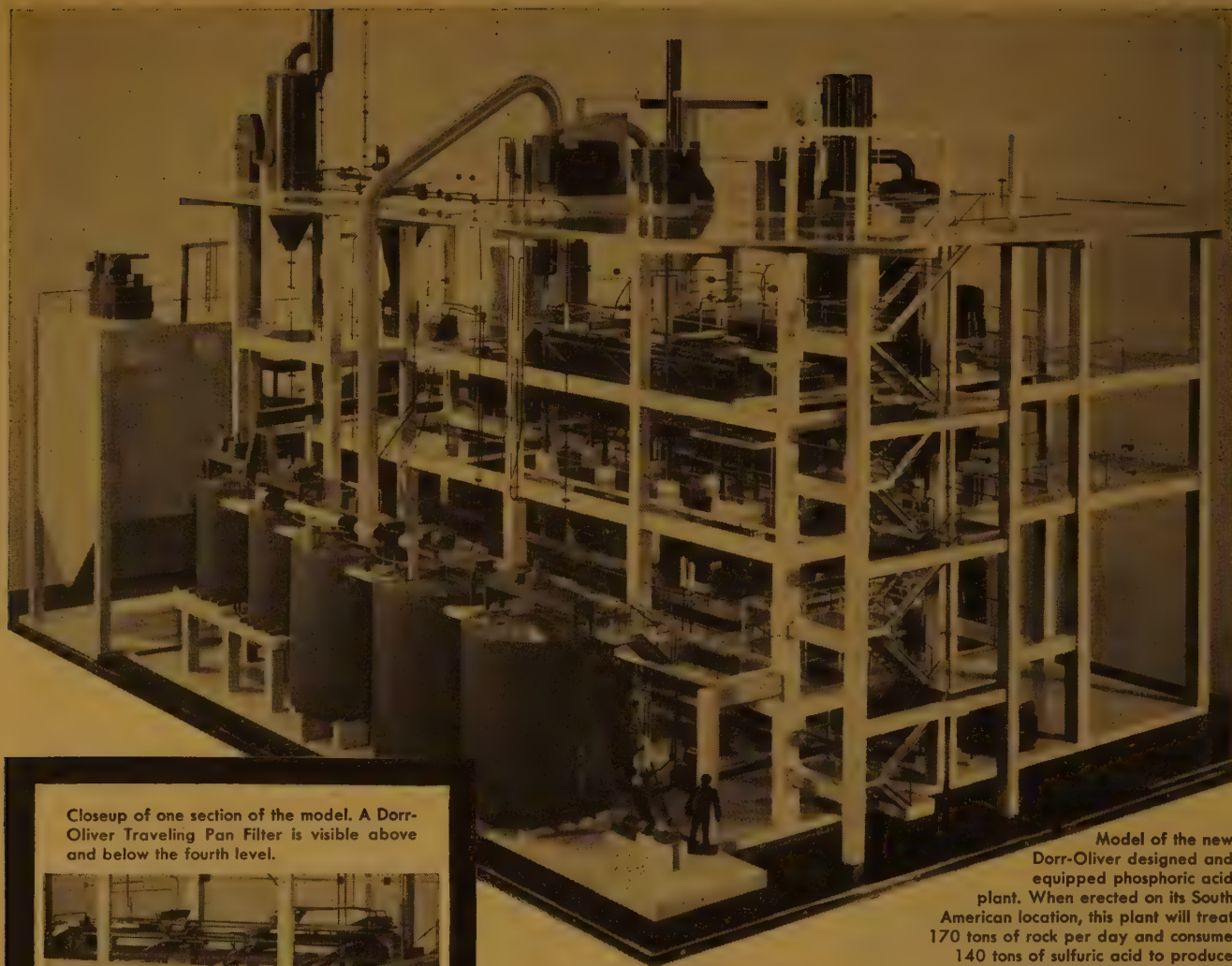
Among those on hand to help answer questions in the symposium, along with the Sohio people, were Dr. K. G. Clark from the United States Department of Agriculture at Beltsville, Maryland, A. V. Slack of the TVA at Muscle Shoals, and Dr. Vincent Sauchelli, chemical technologist with the National Plant Food Institute, Washington, D. C.

Following a luncheon, the visitors were taken on a tour of the petrochemical plant to see the facilities and manufacturing units where the Sohio line of nitrogen chemicals and other petrochemical products are made, in-

(Turn to Page 124)



Left to right are: Dr. Vincent Sauchelli, Nat'l. Plant Food Institute, Herbert Tucker, Ag. Services Director of Sohio, and Henry Coleman, Manager, Sales Division of Sohio.



Closeup of one section of the model. A Dorr-Oliver Traveling Pan Filter is visible above and below the fourth level.



Model of the new Dorr-Oliver designed and equipped phosphoric acid plant. When erected on its South American location, this plant will treat 170 tons of rock per day and consume 140 tons of sulfuric acid to produce 50 tons of P_2O_5 as 54% phosphoric acid.

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If you are considering entering the fast growing fertilizer field — or if you plan to expand present plant facilities — it will pay to check with Dorr-Oliver. Write for a copy of Bulletin No. 8000, or better still, let us send an engineer to discuss your problem from the standpoint of economics and process. No obligation, of course.



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Safety in Aerial Application



a discussion of safety factors for the aerial applicator

DURING the past few years investigation into some of the unexplained crashes of crop-dusting planes has led to the belief that a narcotic-like effect of certain organic phosphate insecticides causes memory lapses, dizziness, and nausea in pilots.

Last summer C. A. Moore, director of the Mississippi Aeronautics Commission, reported to the Flight Safety Foundation, New York, that "we now have reason to believe that the increase in fatalities among aerial applicators is positively due to the use of phosphate insecticides." Mr. Moore said that the blood of a pilot who died after his plane went into sudden, erratic motions and crashed was found to be saturated with such chemicals.

Another example cited by Mr. Moore was the experience of an aerial applicator in Mississippi last summer who was approaching a field and saw power lines ahead of him where he knew there were no power lines. "Moveover," Mr. Moore said, "he didn't particularly care."

Mabry Anderson, president of the Mississippi Aerial Applicators Association, distributed a warning about phosphate insecticides to association members last summer pointing out that some of the accidents in Mississippi have been traced directly to the careless use of phosphates. The organic phosphate insecticides came into widespread use in Mississippi during recent years as a result of the attempt to

find insecticides other than the chlorinated hydrocarbons to control cotton insect pests.

A safety manual, prepared by the Mississippi Aeronautics Commission in cooperation with the Civil Aeronautics Administration and the Mississippi Aerial Applicators Association was published last summer to acquaint aerial applicators with general safety practices and equipment. Many applicators now make regular arrangements for their personnel to receive periodic blood tests as an index of their condition relative to poisoning. The earliest indication of poisoning is a detectable reduction in the activity of cholinesterase in the blood which can be determined only by blood tests. Since normal cholinesterase levels vary with the individual, it is important for the aerial applicator to establish his normal level prior to exposure to any organic phosphate compound.

The signs and symptoms of poisoning in man from the toxic effect of organic phosphates include sweating, tearing, excessive saliva, fluid in lungs, uncontrollable muscle twitches, headaches, giddiness, blurred and distorted vision, weakness, nausea, cramps, discomfort in the chest, and nervousness. After a person's normal cholinesterase level has been established, however, periodic blood tests will show any drop and provide a warning to remove the person involved from further exposure before

the outward signs appear and until the cholinesterase level has returned to normal.

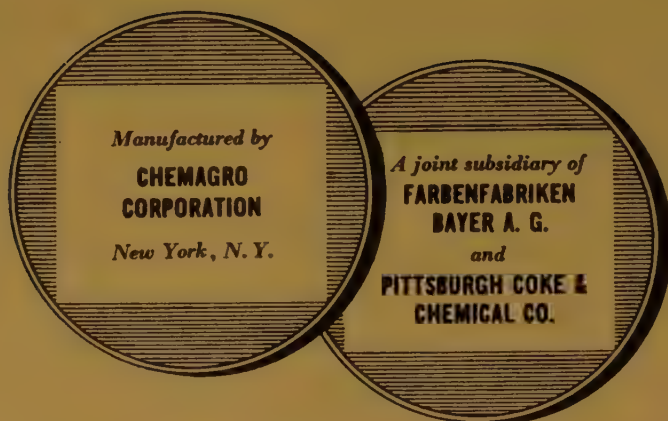
To reduce the chances of exposure, the installation of hopper and dispensing devices in aircraft should be made with the safety of the pilot uppermost in mind. Care must be taken by ground personnel when loading an aircraft so that organic phosphate insecticides do not spill into the cockpit area.

The application of organic phosphates by aircraft should be carried out in a carefully planned manner to prevent contamination to persons or property adjacent to the area being sprayed through drift and, also, so that the pilot will avoid his previous swath and not contaminate himself.

Since the hazards of organic phosphates have become known to aerial applicators, pilots are adding to their list of standard equipment. An efficient respirator, goggles that seal well on the face, crash helmets, washable coveralls, and gloves are joining the safety belt and shoulder harness on the list of mandatory equipment.

Personnel attached to ground operations are being instructed about the results of contamination by organic phosphates. In most cases they are being provided with safety equipment such as respirators, rubber gloves, and boots. Mechanics are told to make sure any spilled insecti-

(Turn to Page 125)



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Monsanto Unveils New Methyl Parathion Plant at Anniston, Alabama

MONSANTO Chemical Co., St. Louis, last month began operations at its new, expanded production facilities at Anniston, Ala., for "Niran" and methyl parathion, two organophosphorous insecticides widely used in commercial agriculture. "Niran" is Monsanto's trade name for parathion.

The new production unit is reported to be the world's largest for the manufacture of these compounds. Start-up of the new plant came less than nine months after the company's Nitro, W. Va. production unit was destroyed by an explosion last April 16. Monsanto thus joins Chemagro, Victor Chemical, Shell, American Cyanamid, and Velsicol in the manufacture of these compounds.

Monsanto's decision to relocate its new facilities for "Niran" and methyl parathion at its Anniston plant was reportedly based on the much closer proximity both to raw materials and to markets for the insecticides. Also the new unit has been closely integrated to chlorine and caustic supplies available at its side. According to Charles H. Summer, Monsanto vice-president and general manager of its Organic Chemicals Division,

another of Anniston's obvious advantages is that it is "on the doorstep of the cotton-growing South," where phosphate insecticides are used in large volume for boll weevil control.

With the objective of eliminating any possibility of recurrence of the Nitro explosions, which had been attributed to instrument failure in the chlorination reaction equipment, the new unit features multiple instrumentation controls for each step of the production process. The entire process is monitored from a special control room, principal feature of which is a huge instrument control panel.

Also, each of the reactor vessels is isolated behind 12-inch thick walls of steel-reinforced concrete block, and, in the event of indications that any particular reaction is not going according to plan, the kettle can be automatically dumped into a neutralization ditch running beneath it. Also any excessive temperature rise in one or more of the reactors triggers a high volume water deluge system.

To further eliminate possible danger areas (especially those caused by buildup of gases and vapors) all of the reactors and other equipment



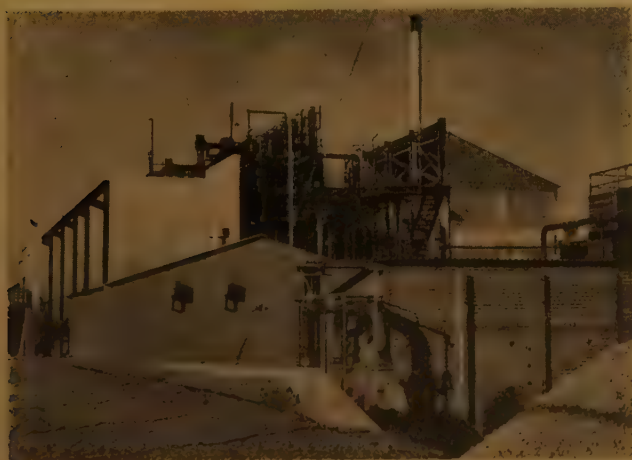
Construction engineers make final check of Monsanto's new Anniston unit for "Niran" and methyl parathion before its recent start-up. The unit is the world's largest for the products.

are set up outdoors—allowing fresh air to circulate freely. Also, a special 100-foot high stack has been installed, through which wastes are burned and the gases harmlessly dispersed high in the air.

However, it is the reactor kettles that are treated with the most caution. In addition to the neutralization ditches, the isolation behind barriers, and the deluge system, the company's engineers have constructed the system so that all purging is done with nitrogen (a relatively inert gas) to eliminate the danger of any oxygen-fed explosion. Then too, since the central control panel operates by electricity (via air pressure-actuated gauges) there is the possibility, in the event of an electrical failure, of a momentary lapse in the metering of pressures, temperatures, etc. To prevent this, the Anniston plant has an auxiliary power system, run by a generator, which begins operating automatically as soon as the usual power source is cut off.

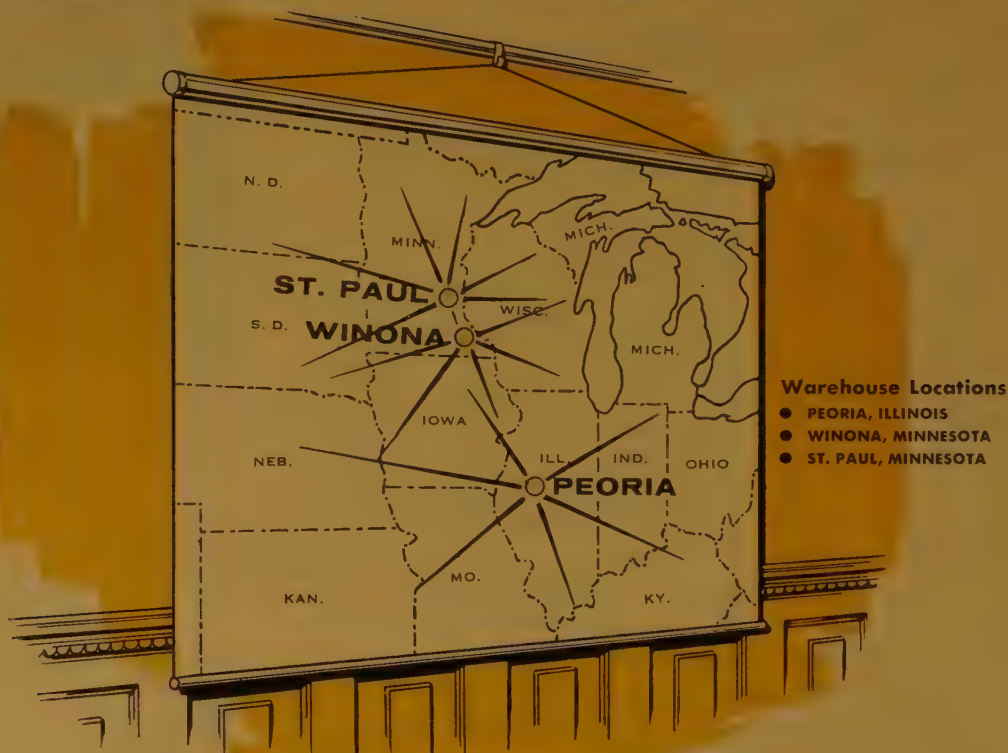
In the control room, a further check is kept on the whole process by means of operating data sheets—which are closely supervised. Chemical analyses are performed at various stages and compared with statistical plots of operating and chemical data to further check on the reliability of the gauges and graphs.

(Turn to Page 122)



This view of Monsanto's new Anniston, Ala., unit for Niran and methyl parathion shows isolation compartments for reactors (left). Low brick building in foreground is part of incinerator for waste products of the unit.

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Fire Ant Control

BETWEEN 20,000,000 and 30,000,000 acres in at least eight, and possibly ten, Southern states will be covered by air and ground crews in the U.S. Department of Agriculture's campaign to halt the spread of the imported fire ant.

The cooperative Federal-State-local program already has begun in Louisiana and Georgia. The campaign, which will continue for a year, is being made with aircraft and motorized ground equipment, applying either ten percent dieldrin or heptachlor in dry granular form at the rate of two pounds to the acre. Under the coordinated program, eradication generally is moving in two directions. From outlying infested areas inward, and from generally infested areas outward. The objective is to clean up areas completely and keep them clean as the program moves forward.

The ant has gained a firm hold in portions of Alabama, Mississippi, Louisiana, Georgia, Florida, and Texas, and to a lesser extent in Arkansas and South Carolina. It has

turned up in North Carolina, been killed off and reappeared. It may or may not be present there now.

Opposition to the program already has appeared in the newspapers, notably the *New York Times* which took exception to the use of dieldrin. The *Times* charges that dieldrin is highly dangerous and its irresponsible use could be extremely hazardous to fish and wildlife. (Pg. 131)

USDA officials emphasize however, that the campaign reflects the composite judgment of insect control officials of the USDA and fish and wildlife representatives.

The USDA's answer to the charge that dieldrin is extremely harmful to fish, birds, and animals is that domestic Tom cats are probably more harmful to birds than the overall effects of the economic poison now being used by the USDA against the fire ant. The *Times'* editorial singled out for emphasis selected control experiments wherein the feeding of animals and birds with doses of dieldrin resulted in heavy mortality rates.

However, USDA experiments show that no such conclusions are warranted and there is no evidence to support any such conclusions.

The USDA says that dieldrin being used in the fire ant campaign is unlikely to exist even as a potential hazard to birds or animals after the first rain on the land treated. It does, however, have a residual effect for as long as three years on the fire ant infestation.

Admitting that there are some inherent dangers in the use of insecticides, the USDA points out that it is far safer to administer these poisons under federally supervised controls than to have them used by individual farmers who perhaps may understand their efficiency but are not fully familiar with their residual effects.

The major problem presented by the fire ant is that it makes houses a foot and a half tall. Some colonies make as many as 200 mounds to an acre. Mowing bars hitting mounds jam or break and, because the ant tunnels several feet underground, poor soil is distributed on top of the topsoil. Furthermore, the ants attack and kill calves, pigs, and chicks. They also bite farm workers.

The cost of the fire ant eradication program is to be divided among cooperators, with the Federal Government paying an appropriate share of the bill, and State and private sources paying the rest. The percentages of contribution are expected to vary considerably in different areas because of land use and ownership. The cost of treatment is estimated at about \$5 an acre. To help prevent the spread of the pest during the eradication program, movement of material that might contain ants will be regulated.★★

Northwest Agricultural Chemicals Industry Conference

MORE scientists in a short space of time have been working on the gibberellins than have ever before worked on any other agricultural compound, James M. Merritt of Rahway, N. J., manager, plant chemicals, Merck & Co., told the fifth annual Northwest Agricultural Chemical Industry conference in Portland, Oregon, at its concluding session January 23.

Gibberellins fit into two major places in the agricultural chemical industry, and apparently can be applied inexpensively with pesticides or fertilizers commonly used. In seed treatments, some 150,000,000 acres can be affected. Applied to growing plants, another vast field opens. The onion family appears to be one of the few unaffected by the material.

Applied to cotton seed, more "good years" can be obtained by speedy sprouting—eliminating second plantings that are almost taken for granted. Potatoes come up all at once when seed pieces are treated. Dormancy of grasses is broken so pastures in Florida and Brazil can be made productive 12 months, instead of 10, each year.

Seedless grapes, apparently naturally short of gibberellin-like materials, increase their yield 80% when treated with a few grams per acre. Studies at Washington State College, Pullman indicate that cherries will crack less, will grow more in size and yet will not turn so dark red when sprayed with this material. At Oregon College, Corvallis, virus-free runners have been developed from virus-bearing mother strawberry plants which were treated with gibberellin.

African violets, along with other plants which ordinarily produce only one bloom per stem, will yield two after treatment. This is because many plants bear dormant buds that ordinarily do not bloom, but the gibberel-

Agricultural Chemicals up-to-minute reports on

- Northwest Agricultural Chemical Industry Conference
- Pacific Northwest Vegetable Insect Conference
- Western Small Fruits Virus Conference
- Western Spray Conference

lins stimulate these buds, Dr. Merritt explained. A different result of delaying fruit setting in some plants can be turned to advantage in mechanical harvesting, he added. Formulations, dosage, and timing for best results in most of the various uses remain to be worked out.

Lloyd Sherwood of Monsanto Chemical Co., St. Louis, in speaking on "The Chemical Revolution in Agriculture," pointed out a number of unsolved problems which chemistry "could and should solve."

These include elimination of wild oats in small grains, killing numerous brushy species of plants, controlling nematodes and numerous plant diseases as well as insects which either so far have defied control or are presently developing resistance to the chemicals now in use.

The need for new chemicals is still critical, he declared, in pointing out that the apple orchardist has some 200 plant diseases and about 100 species of insects attacking his produce.

The Miller bill has a "built-in percentage handicap" against the agricultural chemical manufacturers endeavoring to introduce new materials, R. D. Northcroft of Tacoma, Washington, from the Pennsylvania Salt Manufacturing Company of Washington (western division of the Pennsylvania Salt Manufacturing Company), declared.

With the increase in population we will be looking for more, better, and different pesticides, he pointed out. This will require an investment in fundamental agricultural research

which will be in competition with the investment of money in chemical research (not handicapped by the Miller bill). As a result, fundamental agricultural research probably will not receive as much money from industry as it has in the past, he prophesied.

If only one eye is contaminated with TEPP, a pilot's vision might be affected so he would be unable to judge distance accurately. This could account for some spray-duster plane accidents, Dr. William F. Durham, U. S. Public Health Service toxicology laboratory, Wenatchee, Washington, explained in his talk, "Toxicology of Insecticides."

Empty insecticide containers which have caused numerous deaths, particularly of children playing with them, could have been rendered reasonably safe if they had been rinsed twice with water, he added. Tests made at the laboratory indicated that less than 1% of the pesticide obtained in the first two rinses of empty containers was recovered in the third rinse.

Convicts in penitentiaries have volunteered for tests with DDT and have consumed relatively huge quantities of the material daily over a two year period without the slightest detectable injurious effect. DDT is stored in the body fat in increasing amounts for a year under such conditions, then the total tends to level off over the second year. Tests are now planned to determine how rapidly the DDT is lost after the maximum storage point has been reached, Dr. Durham revealed.

About 125 industry men registered for the convention. To obtain better continuity in the future it was decided to form a three-man group to head the Northwest Agricultural Chemical Industry Association. George W. Coffman, Portland, representing the Diamond Black Leaf Products Company, retiring chairman;

George Kitzmiller, Portland, from the chemical division of Pacific Cooperatives, newly-elected chairman, and Dan Young, Eugene, Oregon, representing the Niagara Chemical Company, were named. Mr. Young will be chairman in 1960, assisted by Mr. Kitzmiller and a chairman-elect to be chosen next year.

**See Pages 57 for a report on
the Western Spray Conference**

Pacific Northwest Vegetable Insect Conference

ALDRIN, Dieldrin, Endrin, Heptachlor, and Isodrin applied at sufficiently heavy dosages provide long-lasting protection against wireworms and tuber flea beetles in potato fields. This was revealed at the 17th annual Pacific Northwest Vegetable Insect Conference in Portland January 20-22 when some 60 scientists from Washington, Oregon, Idaho, Utah, and British Columbia met to compare notes and report progress.

Single applications of the various pesticides at the rate of 10 pounds per acre were made and control results have been checked annually. Near-perfect scores for the following number of years have been recorded: Aldrin and Dieldrin, 9; Heptachlor, 7; Endrin and Isodrin, 5. Toxaphene and Chlordane have remained effective against wireworm for nine years, but flea beetle damage to the tubers is becoming excessive in the trial plots, it was reported.

For the first time in six years consistently successful control of green peach aphids on potatoes has been obtained from aerial application of an insecticide, it was reported from central Washington. Thiodan proved effective, particularly in dusts or sprays. It kills rather slowly if the temperature is below 75°, but quite quickly if the weather is warmer. When the temperature is under 75° comparatively little effect from the material is noticeable for the first day or so. Kills are higher with the emulsion-type sprays or with dusts than they were with the 60-mesh granules.

Yields of sugar beets were increased 1.4 tons per acre by use of

Thimet in treating the seed to control the root maggot, it was reported from Utah. Stand of beets was increased 10%. Dieldrin used similarly produced an increase of tonnage of 0.94. Heptachlor and Aldrin were somewhat less effective.

Beet leafhopper populations were reduced 96% by application of Thimet (44D) to the seed before planting, other Utah tests showed. The leafhoppers moved into the beets when the plants were in their early stage of growth—a time when they are most susceptible to curly top. However, the seed treatment cut this disorder 88%, a count made some two months after planting revealed. Malathion, Thimet, and Diazinon, broadcast by hand in granular form when the beets were first coming through the ground, cut leafhopper populations 92% one

day after the treatment was applied. The leafhopper population was still further reduced to 60% of check plots two weeks later, and obvious symptoms of curly top were reduced almost 80% (79%) 50 days after the treatment.

Onion maggots have plagued commercial growers in the Pacific Northwest for years. Exploratory late-season trials at Oregon State College indicate that Thimet, Diazinon, GC-1189, and Guthion are promising insecticides for onion maggot control. Captan used in combination with some insecticide granules and applied in furrows at the time of seeding provided control of onion smut comparable to the standard formaldehyde treatment.

Carrot rust flies apparently have developed a high degree of resistance to chlorinated hydrocarbons in the Seattle area. This family of chemicals provided good control until 1956, but this past season some 300 acres were totally destroyed. Thimet, with 80% undamaged carrots, provided the best control in tests this year. Parathion, with 44%, ranked second.

Robert W. Every, Oregon State College entomologist, was elected to head the Pacific Northwest Vegetable Insect Conference for the coming year.

Western Small Fruits Conference

VIRUS ailments affecting small fruits in the western part of the United States and Canada were discussed at the annual session of the Western Small Fruits Virus Conference, held simultaneously with the 17th annual Pacific Northwest Vegetable Insect Conference January 20-22 in Portland, Oregon.

Approximately 35 entomologists, plant pathologists, and horticulturists from state colleges, experiment stations, and federal laboratories participated in the discussions.

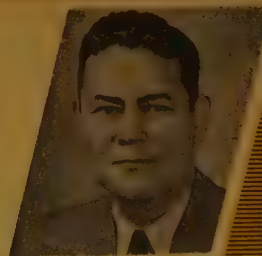
A. W. Helton, University of Idaho plant pathologist, Moscow, Ida-

ho, was elected coordinator for the coming year, succeeding Edward K. Vaughan, Oregon State College plant pathologist, Corvallis, Oregon. He will be assisted by Norman D. Dobie, assistant plant pathologist, Oregon State College, who will serve as secretary.

Among other things the small fruits virus conference will endeavor to avoid duplications in work done by specialists throughout the western area, and will seek to reinforce it. A regional project has been set up and approved, and is now awaiting Congressional action in financing.

LISTENING POST

By Paul Miller



This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, United States Department of Agriculture, Beltsville, Maryland.

STUDIES WITH HEXACHLOROBENZENE SEED AND SOIL SURFACE TREATMENT FOR THE CONTROL OF DWARF BUNT OF WHEAT IN THE PACIFIC NORTHWEST

LAURENCE H. Purdy*, reporting results of investigations conducted jointly by the United States Department of Agriculture and the Experiment Stations, writes that because seed treatment does not prevent infection of wheat by dwarf bunt (caused by the fungus *Tilletia contraversa*) in the Pacific Northwest, the growing of resistant varieties has been the only effective means of controlling the disease there. Recently, however, new races of the pathogen have appeared that can attack varieties possessing all the major factors for resistance so far known. It has, therefore, become necessary to find some other reliable control measure, since resistance can no longer be depended on.

Seed treatment fails because it does not protect the plant at the infection site. The soil is heavily laden with dwarf bunt spores, and since infection takes place at or near the soil surface, a fungicide applied to the seed alone

is too far away to exert protective action at the point where it is needed. Nevertheless, although it does not give satisfactory results when used alone, seed treatment with proper materials reinforces the effectiveness of other control measures.

Soil-surface applications of fungicides have given good results in some regions. Hexachlorobenzene (HCB) is one of the materials that has been tried. Experiments were designed to test its effectiveness in the Pacific Northwest, for both soil-surface and seed treatment.

Experimental Investigation:

The winter wheat variety Orin was used in the tests. Sanocide (40% HCB) was the treatment material employed.

For soil-surface treatments, seed was planted $\frac{1}{2}$ -inch deep in open furrows in naturally infested soil. Dwarf-bunt-free seed was used for half of the furrows, and no inoculum was added to the naturally contaminated soil. For the other half, the seed was inoculated with dwarf bunt spores,

and further inoculum was supplied after planting by spraying the soil surface with a spore suspension. HCB was applied at the rate of 10 pounds per acre, at four different times: at sowing, at emergence, 4 weeks after emergence, and in early spring. Treatments were replicated five times.

For the seed treatment experiment, the soil was inoculated by spraying with a spore suspension before planting. Seed treated at the rate of 2 ounces per bushel was planted at $\frac{1}{2}$ -, 1-, and 3-inch depths, each depth being replicated five times.

Results:

In recording the results, dwarf bunt infection is expressed in percentage of the total number of heads.

Table 1 gives results to the soil-surface applications. In the check (untreated) rows, there was 38 per cent infection in the inoculated soil as against 8 per cent in the uninoculated. In the HCB treatments, the first three applications gave good control in both inoculated and non-inoculated soil. Best control in inoculated soil results from the treatment given 4 weeks after emergence. The spring application (in early March) was completely ineffective, probably because infection had already occurred.

Seed treatment with HCB did not control the disease (Table 2).

Table 1. Effect of time of application of HCB to the soil surface on the control of dwarf bunt.

Time of application	Percentage of dwarf bunt	
	Inoculated soil	Naturally-infested soil
Check (no treatment)	38.0	8.0
At sowing	5.0	0
At emergence	2.0	0
4 weeks after emergence	0.5	0
Spring	20.0	5.0

Table 2. Effectiveness of HCB seed treatment in controlling dwarf bunt at different sowing depths.

Sowing depth (inches)	Percentage of dwarf bunt	
	Untreated seed	HCB treated seed
$\frac{1}{2}$	11	4
1	24	23
3	5	6

*Laurence H. Purdy, "Differential response of dwarf bunt to seed and soil surface treatment with hexachlorobenzene," *Plant Disease Reported*, Vol. 41, No. 11: pages 916-918. Nov. 15, 1957.

However, the results show a definite connection between planting depth

and amount of dwarf bunt. Infection was heaviest in the shallow planting.

Spruce Budworm Expected to be 1958 Problem in Minnesota



This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Plant Pest Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

By Kelvin Dorward

A SHARP increase in the spruce budworm population in Minnesota was first noted in 1954 and has continued at an alarming rate since that date. An aerial survey conducted in 1957 showed moderate to heavy defoliation over approximately 660,000 acres of spruce-fir type in northern areas, an increase of about 240,000 acres over 1956 and 580,000 over 1955. A control program of 16,000 acres on the Kabetogama Peninsula is anticipated for 1958. Prospects are that the over-all population will maintain itself or increase markedly in 1958.

European Corn Borer Survey

AGRICULTURAL agencies in 24 States made observations and counts during the fall of 1957 to determine the number of European corn borers entering hibernation. The number of moths in the spring of 1958 of course depends upon the larvae entering hibernation and the number that survive the winter months. For the entire United States, comparing districts surveyed both in 1957 and 1956, the average for 1957 was 170 borers per stalks and for 1956, 112.

Population of the European corn borer entering hibernation in the Eastern United States dropped considerably under the 1956 fall number. The average for the Eastern States fell from 186 borers per one hundred corn stalks in 1956 to 104 in 1957. The exceptions to this noticeable drop were Rhode Island which showed a State average in 1957 of 312 borers per 100 stalks compared with 335 in 1956; Suffolk County, New York which was considerably under the

1,089 count of 1956 but still had a high count of 550 for the fall of 1957; and Monmouth County, New Jersey which had a count of 408 in 1957 compared with 597 in 1956.

The North Central States showing higher larvae hibernation counts in 1957 than in 1956 are Iowa, Kansas, Missouri, Nebraska and southeastern South Dakota. Comparison for these States is as follows: Iowa 220 in 1956 to 519 in 1957; Kansas 31 to 119; Missouri 90 to 346; Ne-

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braska 147 to 230; and South Dakota 52 to 363 borers per 100 corn stalks. The heaviest concentration of borers is in northern Missouri, western Iowa, northeastern Nebraska and southeastern South Dakota.

The over-all average for the North Central States rose from 102 borers per 100 stalks in 1956 to 178 in 1957.

Populations of the European corn borer reached a level in Arkansas and Alabama which justified a hibernation study during the fall of 1957. Thirty counties surveyed in Arkansas had an average of 28 borers per 100 stalks. In Alabama 4 counties were surveyed and an average of 141 borers per 100 stalks was found.

The spread of the European corn borer continued to be to the south in 1957, particularly in Arkansas, Alabama, Mississippi, and Louisiana. The notable spread during the year was the report of established infestations in 7 northeast parishes of Louisiana. Although the pest was reported from Louisiana in 1948, until 1957 surveys had failed to disclose any additional specimens.

Boll Weevil Counts Up in Some Areas

BOLL weevil fall hibernation counts from Mississippi were reported previously. These counts were up from 1956, being 6,716 weevils per acre compared with 2,091. Counts have now been completed for trash samples collected during the fall of 1957 in Louisiana, North and South Carolina and Virginia. In the northeastern district of Louisiana composed of East Carroll, Madison, and Tensas Parishes, the number of live weevils per acre found hibernating was 8,043. In the 1956 fall hibernation survey, the average for this district was 2,595 live weevils per acre of surface trash. Counts by counties for 1957 were as follows: East Carroll Parish 10,330; Madison, 6,860; and Tensas, 6,940. Records have been taken in Madison Parish for 22 years and in only one year have more live hibernating weevils been found in surface woods trash during the fall survey. In 1955, 13,443 weevils were found.

Hibernating counts in South Carolina were generally higher than in the fall of 1956, while on a downward trend in the majority of North Carolina Counties and in Virginia. The area showing the greatest increase was that consisting of Florence, Darlington, and Marboro Counties, South Carolina and Scotland County, North Carolina. This area averaged 11,374 live weevils per acre of woods trash which was 2,639 more than was found in the fall of 1956. The area of Orangeburg, Bomberg and Dorchester Counties, South Carolina averaged 3,978 live weevils per acre of trash for 1957, which was 266 more than in 1956. The Piedmont area of Anderson, Greenville, and Spartanburg Counties, South Carolina and Mecklenburg, Cleveland, and Union Counties, North Carolina had a count slightly above that for 1956, 6,752 live boll weevils per acre compared with 6,268. The greatest drop was in the North Carolina area comprised of Edgecombe, Franklin, Nash and Wilson Counties. Fall hibernation counts in 1957 were 2,205 which was 2,610 less than the 1956 counts. Hibernation counts in Brunswick, Mecklenburg, Nansemond and Southampton Counties, Virginia averaged 3,335 live boll weevils per acre of trash. This count was 834 less per acre than found in the fall of 1956.★★

DDVP For Cigarette Beetle

Three series of tests were made to explore the usefulness of DDVP in controlling the cigarette beetle in tobacco warehouses. In an exploratory series conducted in semiclosed warehouses, all test insects in the airspaces between hogsheds of tobacco were killed by aerosols applied at the rate of 4.25 grams of DDVP per 1,000 cubic feet; by emulsion sprays applied to the exposed floor and walls and the underside of the roof at a rate of 3.45 grams of DDVP per 1,000 cubic feet; and by a solution sprinkled in the aisles at a rate of 2.1 grams per 1,000 cubic feet. In semiclosed warehouses, the vapors continued to be effective, and insects introduced 24 and 48 hours after treatment were killed within 24 hours. Mortality was low

in ventilated warehouses after 24 hours. Deposits on slides showed poor aerosol distribution. Rats exposed in the treated warehouses for 7 days showed no signs of poisoning.

In a second series, in which DDVP aerosols were used, test insects in the free spaces of warehouses were killed when exposed 1 hour to dosages of 1 gram per 1,000 cubic feet or above. Adults exposed for 24 hours 1 week after treatment showed 43 percent mortality. Exposed eggs were not affected by a dosage rate of 4.25 grams, and there was no significant mortality of larvae or adults at various depths in the tobacco.

In the third series, DDVP solutions were sprinkled on the aisles. At 20-hour exposure rates, results were similar to those of the previous series. However, at shorter exposures, mortalities were lower. In warehouses treated at a 10-gram rate, no symptoms of poisoning were evident in rats and monkeys exposed 7 days or to human volunteers exposed the equivalent of 2 working days. However, a definite effect was noted on the cholinesterase level of monkeys at the 2- and 10-gram dosage rates. Cholinesterase effects on the human volunteers were borderline and of questionable significance. Depression of the cholinesterase rate would have indicated a toxic effect.

"Studies of DDVP for Control of Cigarette Beetles in Tobacco Warehouses" by J. N. Tenhet, C. O. Bare, and D. P. Childs, USDA Bulletin AMS-214.

Cornell Symposium Papers

Five papers, presented at a symposium sponsored by Cornell University on The Role of Agriculture in Future Society, at the New York State Agricultural Experiment Station, Geneva, Oct. 4, 1957, have been published in a 69-page bulletin.

The speakers were: Bruce H. Morgan, former deputy for radiation preservation for the armed forces; Richard L. Meier, research associate in the behavioral sciences, U. of Michigan; Willard F. Libby, commissioner of the U. S. Atomic Energy Commission; Roy C. Newton, vice president in charge of research, Swift & Co.; and Byron T. Shaw, research administrator, U.S.D.A.

32nd Annual

Western Spray Conference

SEVIN looked good in numerous tests against various tree fruit insects, scientists at the 32nd annual Western Cooperative Spray Project meeting (known unofficially as the spray conference) in Portland, Oregon, agreed. From British Columbia to California and Utah, the material was reported to be particularly effective against codling moths (including those resistant to DDT), eye-spotted bud moths, and fruit tree leaf rollers. It looks "promising" against pear psylla, and controls green apple aphids as well as the geminate leafhoppers.

Approximately 60 college and U.S.D.A. experts, extension men and other specialists from seven western states and western Canada gathered for the three-day meeting ending January 24. Tentative plans call for holding next year's session January 21, 22 and 23. Agricultural chemicals industry men will meet at the same time.

Guthion also ranked high in controlling codling moths, green apple aphids, and McDaniel mites in some instances. Tedion was the only miticide controlling the McDaniel species with a single application in Utah. Results with it were labelled "outstanding." The Guthion plots required a second spray only late in the season.

Several new insecticides which received favorable reports from central Washington include:

Thimet (American Cyanamid), a phosphate. Good against aphids, cherry rust and peach silver mites.

Genite (General Chemical), a non-phosphate, pre-bloom spray which has given outstanding control of European red mites. However, close to bloom under slow drying conditions there has been russetting of Red Delicious apples.

Nialate (Niagara), a phosphate,

produced pronounced reduction of peach silver mites.

Tedion (Niagara), a non-phosphate, promising results against European red mites and peach silver mites.

Thiodan (Niagara), a non-phosphate, excellent control of catfacing insects on peaches as well as green apple and green peach aphids.

C-140 (Rohm & Haas), a non-phosphate, effective against green apple aphids.

Dithane (Rohm & Haas), a fungicide, but effective against peach silver mites.

Kelthane (Rohm & Haas), ex-

Oppose Freight Hikes

The fertilizer industry, through the National Plant Food Institute, has advised the Interstate Commerce Commission that any further increases in rail charges will have a "disastrous impact" on the industry.

Statements in opposition to proposed increases in freight rates and charges on fertilizer and fertilizer materials were submitted to the ICC on Jan. 20. In these statements, the industry indirectly warned the rail carriers that their latest proposed increase may prove to be a boomerang—that it will lead more and more fertilizer companies to move their traffic over the highways rather than by rail.

Paul T. Truitt, executive vice president of the NPFI, told the commission that the profit margins of the industry are now so low, as a result of past increases in rates and other costs, that another round of increases will be ruinous to many members of the industry.

He presented evidence showing that with minor fluctuations the price of fertilizers to the farmer has remained at the same low level over the

cellent control of pome and stone fruit mites.

Dieldrin and Endrin (Shell), outstanding results against caged lygus, cutworms, and stink bugs. Good initial kill and long residual action. Dieldrin also provided good control of pear psylla.

Trithion (Stauffer), good control of cherry rust and peach silver mites. Some russetting of apples and injury to leaves.

Diazinon and Trithion produced as good control of codling moths as did DDT, it was reported. Washington experts did not record foliage injury which has been reported from the East following application of Trithion.

Guthion, Sevin, Diazinon, and Trithion all will control woolly apple aphids.

Genite 923, Mitox, and Ovex have given successful control of European red mites.

past decade while prices of other farm supplies have risen from 20 to 30 percent. He argued that nothing should be done that would discourage replenishing of the plant foods in the soil.

Conn. Rejects Spray Bid

Connecticut has turned down a government bid to join in a proposed 1958 gypsy moth spray program, according to a report in the *New York World Telegram & Sun* last month.

Neely Turner, head of the state's agricultural experiment station, was reported as saying that he rejected an informal request to join the Department of Agriculture's DDT spray program on grounds that as far as Connecticut was concerned the mass spraying was unnecessary and wouldn't eradicate the pest.

The paper said that L. F. Curl, assistant director of the Plant Pest Control Bureau of the USDA, stated that the agency has made informal approaches to Connecticut. He added, however, that it had never considered the state essential to its 1958 program.

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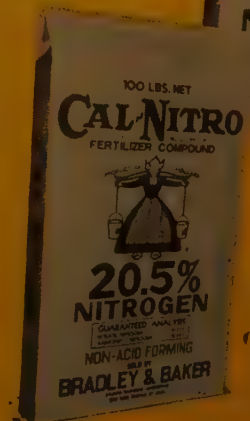
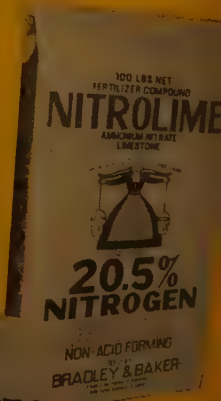
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POTASH Company of America should be ready later this year to start shipping potash from its new plant at Saskatoon, Saskatchewan, Canada. (*Agricultural Chemicals* June, 1957, Pg. 34.) This leading American potash producer in 1957 put an additional amount of more than \$400,000 into its 20 million dollar mining operation in Western Canada. One of the deposits which it will work in the Saskatchewan potash fields is reported to contain more than 100 million tons of ore of higher average grade than any previously mined. Potash Company anticipates production at the rate of about 600,000 tons of Muriate of Potash by 1959, and anticipates expanding its Canadian capacity as market conditions react.

Mining of these Canadian deposits is bound to have a strong impact on commercial potash production in the U.S. Some companies have indicated that they will find it necessary to curtail production at existing plants at Carlsbad, New Mexico, when the new Canadian production starts to come on the market.

Motives Behind Developments

THE activity of U. S. potash firms in developing new production in another country when their own country's needs are being amply supplied from domestic sources is remarkable in many ways. It is expected that

within the forthcoming decade about half of the potash fertilizer needs of the U. S. will be coming from Canadian sources. The motives behind this have been explained by students in this way: The country still remembers what it was like to be dependent for such an essential mineral upon one single source; and the producers have a clear memory of the crippling effects of a lengthy strike at the Carlsbad mines in 1949 and 1950 which reproduced only too well the World War I predicament of dependence on a single source.

A favorable factor in the Canadian development is that the Saskatchewan potash can be delivered at freight costs approximately equal to those in effect from Carlsbad to heavy potash consuming areas of the United

States. Although the New Mexico deposits are substantial, they have been worked already for about 27 years and mining companies must plan ahead for their supplies for at least the same number of years. For American and Canadian farmers, the prospect for many years is for stabilized, reasonable prices for potash.

Cropping removes about 5 million tons of potash yearly in the U. S. and additional losses are suffered through leaching and erosion of topsoil. Agronomists throughout the eastern half of the U. S. have shown that if optimum crop yields are wanted, larger supplements of this essential nutrient will have to be made to the soils of these regions. Their recommendations have been reflected in the gradual increase of the average ratio of plant nutrients of the fertilizers sold in the area. The ratio of nitrogen to potash is now about 1 to 1.

U. S. Productive Capacity

DATA on U. S. capacity are not completely available from most producers. Much of what is published is not comparable because one firm reports on "finished product," another on "muriate and other products" and so on. The estimates in the table below are given for what they may be worth. They are believed to be fairly accurate.

During 1956, potash deliveries in North America were 4 million tons of salt equivalent to 2,300,000 tons of K_2O of which 1,870,000 tons were used by U.S. farmers.

Table 1.
Estimated U. S. Potash Capacity

Tons per year as K_2O		
Producer	Location	Capacity
American Potash & Chem.	Trona, Calif.	225,000
Bonneville	Wendover, Utah	50,000
Duval Sulfur & Potash	Carlsbad, N. Mex.	240,000
Intl. Minerals & Chem. Corp.	"	375,000
National Potash Co.	"	240,000
Potash Co. of America	"	550,000
Southwest Potash Co.	"	250,000
U. S. Potash Co.	"	540,000
Others	"	10,000
Total		2,480,000

Fertilizer Views and News

Dr. Sauchelli is the agronomist for the National Plant Food Institute.

Dr. Vincent Sauchelli



"Balanced Fertilizers"—An Inquiry

BALANCED fertilizer" is a commonly used phrase in the fertilizer trade and frequently in scientific circles. It has the force of a convention representing an acceptable fact. What does it mean, factually? To me it seems hackneyed like so many other phrases which have acquired popularity and acceptable usage even where they are not suitable to the context. Each of us has a certain mental picture of "balance." When a person applies the word to a certain kind of fertilizer compound it is what Fowler, in *Modern English Usage*, calls a "slipshod extension." How, then, did the phrase originate?

The modern fertilizer industry is based on the chemical investigations of von Liebig in Germany and John Lawes in England dating to about the middle of the last century. Liebig had proved that plants utilized for their nourishment mineral elements from the soil and among these phosphorus and potassium were of major importance. In the early years of the industry, mixed fertilizers were compounded chiefly from superphosphate and organic materials. When potash salts from German deposits became commercially available the manufacturers added potash to the mixture to furnish the triad of major nutrients, NPK. The product became known as a "balanced" fertilizer mixture. Ever since, the industry, particularly in the United States, has continued to produce fertilizers formulated to furnish these major nutrients. Moreover the common trade practice is generally to evaluate any source of raw fertilizer material primarily on the basis of its content of nitrogen, phosphate or pot-

ash, or a combination of them. Until very recently little consideration has been given to their partner chemical elements, as previously mentioned, even though agronomists may have demonstrated their plant nutritive value. For example, normal superphosphate contains lime and sulfur in the form of calcium sulfate, both known to be essential to plant life. But the trade judges the value of the superphosphate solely on the basis of its available phosphate. Sulfate of ammonia, rich in sulfur content, is sold on its nitrogen content only. This is not only unscientific, it is unrealistic. These partner chemical elements do influence chemical reactions in the soil as well as in the processing of the fertilizer and may not be ignored.

Recent studies in Great Britain* and elsewhere draw attention to these potential reactions and compel us to reconsider whether the old concept of "balance" in a fertilizer based merely on its N P K content is adequate.

The soil scientist prefers to speak of the ions rather than elements in a compound; cations for basic elements such as calcium potassium, magnesium, ammonium and sodium, and anions for acidic elements such as phosphorus, sulfur, chlorine. The concept of "ionic balance" in fertilization is finding acceptance among soil chemists and agronomists. It is known now for instance that sodium can replace potassium to an appreciable extent in plant nutrition; that the lime in basic slag or cyanamid may play an essential role in soils deficient in it. Furthermore, agronomists now recognize that the favorable results of

field and plot tests could have been attributed to the calcium sulfate of normal superphosphate with as much justice as giving all the credit to the phosphate. These ignored partner ions can and do have also physical effects on the soil. Sodium and silicon and calcium definitely do this. Which leads us to question the attitude that the application of lime to the soil is something different essentially from fertilizing with say ammonium nitrate or an N-P-K mixed fertilizer or superphosphate. How can one separate the effects of the calcium cation present in superphosphate or cyanamid from calcium in burnt lime or limestone? The agronomists are perhaps at fault in this respect and many of the results of old field and plot tests, reported solely on the basis of N-P-K in the fertilizers while disregarding the cationic or anionic system as a whole are suspect.

Dr. Nicol, as did Dr. K. A. Bendorff of Denmark before him, stresses the point that we must regard fertilizers as salts capable of producing the sort of chemical and physical effects one expects of salts. "Balance" in fertilizers is not to be measured merely by a certain ratio of $N:P_2O_5:K_2O$, but rather by a consideration of the effects of the total ionic system. To the pH concept of soil reaction must be added the pC or electrical conductivity concept: Fertilizers therefore are to be looked on not merely as sources of certain plant nutrients; liming is not something that changes only the pH of the soil or exchangeable base. Fertilizers cause alterations in the interdependence between ions and colloids of soil, plant and fertil-

(Turn to Page 121)

*Ionic Balance in Fertilizing. Hugh Nicol, Fertilizer & Feeding Stuff Journal, 12/4/57.

A. S. Crafts Heads Weed Society of America

MORE than 700 persons attended the joint meeting of the Weed Society of America and the Southern Weed Conference at Memphis, Tenn., Jan. 12 to 15. The theme of the session was fundamental research in weed control. W. B. Ennis Jr., Crops Research Service, ARS USDA, Beltsville, Md., outlined the challenges of weed control, stating that progress in weed control is directly related to research efforts by public and private firms. He emphasized that basic research in weed control must be strengthened.

Dr. H. L. Haller, assistant to the administrator, production research, ARS, USDA, spoke on the impact of Public Law 518 on herbicide research and recommendations.

He said one of the most important problems still confronting herbicide workers is the need for residue data for those chemicals which were approved for use on certain crops prior to the enactment of PL 518 but for which no tolerances or exemptions have as yet been established.

Dr. Haller said that much remains to be learned concerning the most effective use of herbicides. When used on food plants, he said, a knowledge of the factors influencing their absorption, translocation and distribution, and breakdown is important. Research findings indicate that most of the modern organic weed killers break down fairly quickly. However, to comply fully with PL 518, information must be obtained on the metabolites as well as their toxicity and the extent to which they may be present on food plants.

After the general session, the meeting divided into various sections, such as; agronomic crops, horticultural crops, pastures, rangeland, forests, right-of-ways, and others.

The total acreage of farmland sprayed for the control of weeds in 1957 was more than 35 million acres of miscellaneous crops, such as peanuts, soybeans, and a variety of vegetables and other horticultural crops. The acreage sprayed for weed

control exceeded the total acreage sprayed and dusted for insect and plant disease control.

The next meeting of the Weed Society will be held at the Cosmopolitan Hotel in Denver, Colo., Feb. 22 to 25, 1960. The Southern Weed Conference is scheduled to meet in Shreveport, La., Jan. 21 to 23, 1959, at the Washington-Youree and Capitan Shreve Hotels.

Dr. A. S. Crafts of the Univ. of California, Davis, was elected president of the Weed Society of America for the next two years. Other officers are Dr. K. P. Buchholtz, U. of Wisconsin, Madison, vice president; Dr. W. C. Shaw, ARS, U. S. D. A., Beltsville, Md., secretary; and Dr. W. C. Jacob, U. of Illinois, Urbana, treasurer.

The Southern Weed Conference, host for the Society meeting, elected Dr. Richard Behrens, ARS, USDA, College Station, Tex., president; V. S. Searcy, Alabama Agricultural Experiment Station, Auburn, vice president; and Dr. W. K. Porter Jr., Louisiana State University, Baton Rouge, secretary-treasurer.

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INSTANT (powder) for quick and efficient mixing of Bordeaux sprays.

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An ALL-NEW concept in valve construction . . . "DUETTE" is actually *two valves in one* with a **DOUBLE CHECK ACTION**. Thoroughly tested and proved siftproof, without packing trouble.

There's never been a sewn multiwall valve like it. It's NEW . . . not just another way of shaping, creasing, notching or slitting . . . but an *addition* that acts as a valve-on-a-valve, giving double sift protection.

Bemis "DUETTE" Valve Multiwalls, tested in full-scale production for over a year, have

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NEW AND DIFFERENT!**

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TRADE MARK

multiwall sleeve valve



WON'T CLOG . . . This view shows how the Magic Yellow check flap falls freely aside from the valve slit, giving no interference whatever to proper operation of the packing spout. The sleeve won't choke or clog the packer.

POSITIVE CLOSING ACTION . . . This diagrammatic picture shows action as the flap starts to close over the valve slit.

CAN'T SIFT . . . When the bag is filled, the Magic Yellow flap, acting as a check valve, completely overlaps and covers the valve slit, keeping the fertilizer from reaching the place where it might find a chance to sift.

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MATHIESON PESTICIDE NEWS

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Cotton Production Costs Now Reduced by TERRACLOR

Cotton growers everywhere today are advised by the National Cotton Council to reduce production costs.

In keeping with that theme, Terraclor enables growers to control seedling damping-off or "soreshin" caused by Rhizoctonia and thereby eliminate the cost, time and labor of replanting a substantial part of their acreage.

Terraclor has been aptly called, "the ounce of prevention". After six years of testing, it has been demonstrated that Terraclor may increase yields and return the grower more than 15 times his investment by promoting vigorous, uniform stands of better quality cotton.

Compare that to replanting costs of \$5-15.00 per acre and the fact that various cotton growing states report the necessity of replanting as much as 10-25% of the acreage each year.



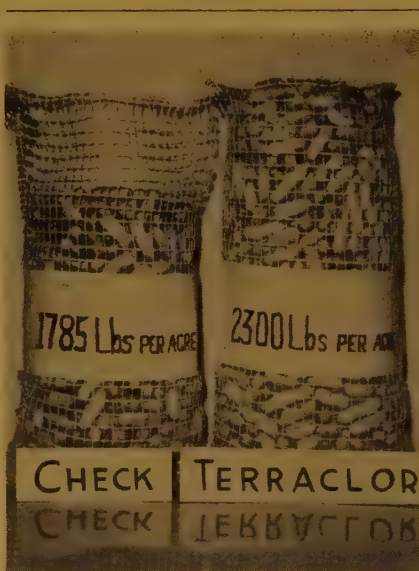
This California cotton dispels any doubts of damage damping-off can cause as witness the two rows on left. The rows on the right were treated with Terraclor.

Terraclor is available as a 75% wettable powder, 2-lb. emulsifiable concentrate, and a 10, 20, and 40% dust. Terraclor may be applied by conventional dust application methods, either broadcast or in-row. It may also be applied with conventional spraying equipment and techniques.

TERRACLOR® is a trademark

NORTH CAROLINA RECOMMENDS TERRACLOR FOR PEANUTS

North Carolina has just announced its recommendation of Terraclor, the new soil fungicide, for control of Southern Blight of peanuts.



These are the results of a Terraclor field test in Portales, New Mexico. Controlling stem and root rot provided an increased yield of 515 lbs. of clean peanuts per acre.

TERRACLOR accepted for many crop uses

Terraclor has been accepted for many label registrations. The following run-down illustrates the scope of this valuable new soil fungicide:

Cabbage, Cauliflower, etc.: club root and black root or wire stem.

Tomatoes, Peppers: Southern blight.

Cotton: Rhizoctonia damping-off.

Peanuts: Southern blight.

Beans: Root and stem rot.

Lettuce: Leaf drop, bottom rot.

Potatoes: Scab, Rhizoctonia.

Wheat seed: Common smut or bunt.

Garlic: White rot.

Alfalfa, Clover: Crown rot.

This announcement is a far reaching step in the control of a disease that has caused crop losses as high as 50-60%. For the first time, growers have a chemical available that economically controls Southern Blight.

As most peanut growers know, Southern Blight (also known as Southern Stem Rot and Root Rot) lives in the soil and attacks plants at or near the soil line. The entire plant may be killed or the pegs may be attacked. Late season peg attacks result in many unharvested peanuts which are left behind in the soil because of weak, rotted pegs. Also, pods may be blighted, discolored and rotted.

Terraclor is a preventive control that may increase yields as high as 350-500 lbs. per acre of clean peanuts—free from soil. A single application at pegging time of 120-150 lbs. of 10% dust per acre will return the grower many times the cost of the chemical invested.

A Terraclor-Land Plaster Mix containing 3.75% actual Terraclor is one of the most convenient methods of application. The rate is 400 lbs. per acre over the row.

TERRACLOR Literature Available

Write for these folders giving complete Terraclor information:

- Terraclor for Cotton
- Terraclor for Peanuts
- Terraclor for Vegetables
- Terraclor for Crucifers (cabbage, cauliflower, etc.)
- Terraclor for Ornamentals
- Terraclor for All Recommended Crops

WASHINGTON REPORT

By Donald Lerch



THERE are growing signs the pesticide industry will take major steps to combat the series of complaints against community-wide eradication programs. Several individual companies are putting their top management and public relations skills into the fray. NAC is sparking a drive with industry and government to report more facts to the public.

Recent statements by government and state officials plus the strengthened program of industry should get community-wide pest control programs back into proper perspective.

During my latest meeting with leaders in Florida, New York, New Jersey, and the midwest, there was general agreement that large-scale pest control programs are succeeding and that people, wildlife, and property are being protected. However, a planned and skillfully managed information program has been lacking in some instances. So, it's good news this situation is being corrected.

* * * * *

Editorial attacks on the fire ant program are sparking action by both government and industry, particularly on the information front. Industry is determined that the great advantages to farmers and the general public from pest control efforts should not be discredited by a few editorials or news stories that fail to report either the significance of the problem or the control.

AGRICULTURAL CHEMICALS magazine is assured that all technical phases of the control program are sound, and that the operation of the eradication campaign will result in safety to man and animals.

The chances are you'll be reading and hearing more statements

pointing up the advantages and safety of communitywide pest control programs in the weeks and months ahead, as industry and government move to keep facts before farmers and the public.

* * * * *

Action by the Food and Drug Administration in setting a tolerance of zero for methoxychlor in milk settles speculation about whether the crown of purity would be displaced. FDA welcomed detailed consideration of this matter to the full extent afforded by law—even to the appointment of a special study committee by the National Academy of Sciences, headed by Dr. Herbert E. Longenecker.

It had been felt by many that a tolerance of 0.25 ppm of methoxychlor in milk would not constitute a hazard to health, and would represent a practical solution to the problems which would still permit use of the material as a fly spray. The negative action taken in this case by FDA, however, forecasts that more problems will arise in the establishment of tolerances on forage and feed crops consumed by dairy cows.

Facts are that there are traces of some pesticides in some milk, however it's generally conceded that these residues do not constitute a health hazard. Nonetheless from a legal standpoint, the government intends to keep milk free of residue and thus tolerance decisions can be expected to reflect this position.

* * * * *

The battle to save the USDA's programs of production research is on. Economy advocates, who have long been critical of the dollars spent in agricultural research for improvement of production efficiency in the face of

ever mounting surpluses, see golden opportunities this year to get in their licks when the Department's money bill comes up for consideration. The thread of their argument is that increased funds needed for missile development and defense must be offset by reductions in other directions, and what better place to begin cutting than in those funds which, in the long run, seem to aggravate the problem of farm surpluses.

Some very strong arguments are going to have to be advanced to counter these contentions of the economy advocates. Also, the real firing must be aimed at the appropriations Committee of the House, for that is the group that sets the pace on expenditures. Chairman Clarence Cannon's warning against a "spending spree" in the guise of defense is the tip off that his committee will be examining closely every budgetary request that is not tied directly to the missile and defense programs.

The job cut out for the friends of agricultural research will be to convince the members of the Appropriations Committee that production research does not necessarily mean increasing production of a product already in ample supply. It more often means showing the way growers can hold their own in the battles against insects and diseases. Dr. Byron T. Shaw, USDA's Chief of Research, points this up when he asks "who can say how many plant breeders are needed to maintain the status quo on stem rust diseases of wheat, or how many scientists are needed to hold the line on the spotted alfalfa aphid and the soybean cyst nematode?"

"I don't know the answer," says Dr. Shaw, "But I do know this. The

alfalfa aphid has spread over 31 states and destroyed more than 80 million dollars worth of alfalfa since it was first discovered in California in 1954. And the soybean cyst nematode, unknown in this country before 1954, has been found from North Carolina to Missouri. Production research that fights these outbreaks of stem rust, alfalfa aphids, nematodes and other pests does not increase total production. At best it only helps farmers hold their own against the myriad insects, diseases, weeds, and weather that can wreck farm production."

To the arguments that will be heard that everyone knows that application of fertilizers will increase the production of a given crop so why spend money to prove it, Dr. Shaw will be able to point to the fact that it is not the immediate problem of greatest concern, but it's those years in the future when there will be more mouths to feed without the advantages of a proportionate expansion of crop lands.

Although one can find many examples of how soil improvement with fertilizers—or other practices—has increased farm output, nevertheless, the level of soil fertility in the United States is still declining. Dr. Shaw emphasizes that we're not doing enough research nor getting enough of our research into practice to stem the loss. It is estimated that we are losing about half-a-million acres of crop land every year to erosion and other depleting processes.

* * * * *

The Senate and House Committees on agriculture are setting the stage for a full dress review of the Administration's farm program this session. But this being an election year, it seems probable that it will produce more smoke than fire, for few people expect any sweeping changes which do not first have the approval of the Administration. What changes are legislated are not calculated to have any great effect on the markets for agricultural chemicals.

Primarily, the Committee reviews will encompass all three main phases of the program—farm export problems encountered under Public Law 480, price supports and the Adminis-

tration's aim to lower them, and the soil bank. Beneath all this, however, will be the running battle by the critics of Secretary Benson for his scalp. Though the Secretary has been able to weather a rising tide within his own GOP to unseat him from his Cabinet post, the "get Benson" campaign has been only slightly blunted. Thus, hearings by Congressional Committees on the legislative proposals of the Secretary will be turned more towards next November than to the economic questions immediately involved.

The one thing currently raising the largest head of steam is the proposal to cut back on price supports to a range of 60% to 90% of parity from the present 75% to 90%. Mr. Benson wants authority to set prices within this range with the help of an advisory commission. So far there has been a dearth of support from members of Congress for the plan, but a resounding protest from critics, especially from the dairy states whose price props are being cut for the new marketing season starting next April.

One of Mr. Benson's major legislative recommendations—which also has the backing of the White House—is termination of the soil bank's acreage-reserve program at the end of the 1958 crop year. This is the short-range program designed to persuade farmers to take land out of cultivation of basic crops that are in surplus. The soil bank's conservation reserve is the long-range program to retire land for 5 to 20 years and to keep it in grass or trees. The Secretary wants to put more emphasis on this program.

Congress adopted the soil bank in 1956, but has been extremely critical of the acreage reserve program. Mr. Benson himself has never been enthusiastic about it, but feels that when Congress last year limited acreage-reserve payments to \$3,000 for each producer it weakened it unnecessarily. Nevertheless, he credits the program with preventing the surplus problem from being worse than it is because it enabled farmers to hold crop land in production to just under 30 million acres.

As a result of the acreage reserve program alone, the nation last year had about 2 million bales less cotton, 6 million hundredweight less rice, 93 million pounds less tobacco, 225 million bushels less corn, and 175 million bushels less wheat. Also, the soil bank program supplemented farm income and helped to bring about the second consecutive peacetime increase in farm income despite rising costs.

By reporting some of the scientific successes of the Department last year, Mr. Benson also notes the virtual eradication of the Mediterranean fruit fly in Florida; use of the byproducts of atomic energy in a campaign against the screwworm which is seriously menacing livestock and wildlife; and purifying, isolating and photographing the virus of foot-and-mouth disease.

* * * * *

Higher freight rates being demanded by the railroads on the traffic of the agricultural chemicals industry and other shippers is raising questions among trade associations and others as to how much further the railroads figure they can go before they start reaching the point of diminishing returns.

The latest move of the carriers to hike the rates on chemicals about 3%, with specific increases of 1¢ per 100 lbs. or 20¢ per net ton for fertilizers and fertilizer materials generally, and 10¢ a net ton on phosphate rock, is reportedly causing some concern as to whether shippers might not be wise to consider a switch to other forms of transportation.

The announced purpose of the rate increases is to provide additional revenue to offset increased wage rates and other operating expenses. But to the extent the increased rates might cause diversion of traffic to other forms of transportation — truck or barge lines—they would be self-defeating. There is serious thinking by a great number of companies who are considering acquiring their own vehicles. Privately owned and operated trucks, besides their other advantages, make possible avoidance of the 3% transportation tax that applies on shipments by common carrier.

Arcadian News

Volume 3

For Manufacturers of Mixed Fertilizers

Number 2

How to Sell More Mixed Fertilizers for CORN

Corn is the biggest single market for fertilizer in this country. Every state grows corn. More fertilizer is used on corn than on the next four crops combined. Yet many fertilizer manufacturers are not taking full advantage of this market because they do not produce mixed fertilizers which supply the complete plant food needs of corn. Farmers are forced to use heavy applications of nitrogen, in addition to mixed fertilizers, to grow big yields.

You can capture more of this market for mixed goods by producing and selling high-analysis, high-nitrogen fertilizers for corn. It takes 160 pounds of nitrogen, 60 pounds of phosphoric acid and 120 pounds of potash to grow 100 bushels of corn. Yet some fertilizer manufacturers are still promoting a 1-4-4 ratio for corn.

It is true that the fertilizer analysis cannot be based on actual plant food removal. More phosphorus is needed because part of the phosphorus is changed in the soil to forms not immediately available. Less potash may be needed because much potash stays in the stalks which are plowed down.

Stalks also contain nitrogen, but to speed the breakdown of old stalks and roots into nitrogen-rich, potash-rich organic matter, fertilizer nitrogen is needed to feed the soil organisms that do the job.



About 20 pounds of nitrogen per ton of stalks is the accepted figure, and a 100-bushel crop produces 3 to 4 tons of stover and roots.

In any event, corn is a crop that requires plenty of nitrogen to produce profitable yields. Why not recognize this fact and sell high-analysis, high-nitrogen fertilizers for corn. More and more manufacturers are increasing their profits by selling 2-1-1 ratios, such as 16-8-8, 14-7-7, 12-6-6 and 10-5-5, as plow-down

fertilizers for corn. High-nitrogen mixed fertilizer plowed down in the fall or spring, followed by the proper mixed fertilizer at planting time, can supply the total plant food needs of corn with mixed fertilizers.

Good farmers are going to use plenty of nitrogen on corn. It will pay you to sell this nitrogen in mixed fertilizers. For information on how to make high-nitrogen fertilizers, turn the page . . .

How to Make High-Nitrogen Mixed Fertilizers for Corn

Most farmers who produce big yields of corn are big users of nitrogen. If you add together the total plant foods they use on the crop, including mixed fertilizers and straight materials, you'll often discover a 2-1-1 ratio or a similar high-nitrogen combination. So why not put this combination in your fertilizer bag and supply the needs of corn with mixed fertilizer?

The new trend in mixed fertilizers for corn is toward high-nitrogen ratios for two reasons: 1) Corn needs high-nitrogen fertilizers to produce profitable yields. 2) The new ARCADIAN® Nitrogen Solutions make it easy and practical to formulate high-analysis, high-nitrogen mixed fertilizers in almost any plant.

The trend is obvious. Where 1-4-4 and other low-nitrogen analyses once were predominant, 1-1-1 ratios have become important and some manufacturers are having outstanding success with 2-1-1 ratios, such as 16-8-8, 14-7-7, 12-6-6, and 10-5-5. Why not take advantage of this trend to build your own sales and profits?

As a result of the development of modern ammoniating solutions, high-nitrogen fertilizers are now much easier to make in regular mixing equipment. One successful method uses URANA® or NITRANA® Solutions which are high in nitrogen and low in free ammonia. These solutions, plus sulphate of ammonia, are enabling mixers to put a high-nitrogen content into good quality mixed fertilizers.

Another practical method uses URANA or NITRANA Solutions with a high content of free ammonia, with the addition of sulphuric acid in the mixing. This amounts to making your own sulphate of ammonia during the mixing process.

Either method will produce good quality, high-analysis fertilizers with real economy. The best method for you to use depends on plant equipment, cost of materials, and the actual ratios you wish to produce. Your Nitrogen Division technical service representative can be helpful to you in selecting the method best adapted to your particular needs.

Production of high-nitrogen mixed fertilizers for corn and other crops will

enable you to supply a bigger share of your customers' total fertilizer needs with mixed fertilizers. You will also be in a better position to increase your sales of actual plant food, with lower freight rates and greater profits.

For technical help on the production of high-nitrogen fertilizers in your plant, contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y. This service is available to customers, without charge.



EVERY FIELD A DEMONSTRATION PLOT!

One of the best ways to demonstrate the value of fertilizer is to persuade farmers to run their own simple fertilizer tests. Suggest to the farmer that he use no fertilizer on one strip across his field. This makes a check strip. Then tell him to double the usual fertilizer application on the next strip. Then use his normal fertilizer application on the rest of the field. Time spent in getting farmers to run these simple tests will pay off in extra sales. The photo above shows a wheat field where one strip got no fertilizer. There is a big difference in the rest of the field where fertilizer was used. But, remember this! Many farmers, even when they follow state recommendations, are not using enough fertilizer for maximum yields and profits. A strip with double the usual fertilizer application is often one of your best sales tools!

Survey Results Now Available

A report has been prepared based on the results of a new and intensive survey to determine motivations that influence farmers' fertilizer buying habits. This personal-interview survey was conducted by an independent research organization employed by Nitrogen Division, Allied Chemical. *Part I* of the

findings of this survey is now available for distribution. It contains significant new information of interest to fertilizer manufacturers. To obtain a free copy, simply request *Farm Fertilizer Survey, Part I* from Nitrogen Division, 40 Rector Street, New York 6, N. Y. Your copy will be mailed to you promptly.



ANALYZING FERTILIZERS for PLANT FOOD CONTENT

It is vital to your business to make sure that control officials find correct analyses when they examine your fertilizers. You may formulate with the right amounts of ingredients, using good machinery and skilled operators, but if your fertilizers fail to meet minimum guarantees you are in trouble.

Nitrogen Division has conducted extensive research in the development of more efficient methods for determining the plant food content of fertilizers.

Part of this research has been devoted to the sampling of ammoniating solutions. A "squeeze bottle" method invented by a Nitrogen Division chemist proved to be outstanding in simplicity and accuracy. Presented at the 1956 meeting of the Association of Official Agricultural Chemists, this method is winning rapid acceptance.

Some problems require the united efforts of many chemists. Nitrogen Division cooperates fully in this work.

In analyzing fertilizers high in both nitrate and chloride, such as many 10-10-10's and 12-12-12's, chemists knew they were losing nitrogen during the Kjeldahl digestion because they saw brown fumes escaping. The reduced iron method was devised to avoid this loss, and given official status by the A.O.A.C., after cooperative testing in which Nitrogen Division chemists participated. In addition to providing better analysis of 1-1-1 ratios, this method is also helpful in analyzing nitrogen solutions that contain urea.

Sometimes it is necessary to determine distribution of nitrogen in different forms, as well as finding total nitrogen

content. As a special case, there may be interest in the amount of biuret. Confronted with this problem, Nitrogen Division chemists studied known procedures and then developed a more accurate method. Published in 1955, this method is now generally accepted. Work is now under way to apply this procedure to complete fertilizers.

About two years ago, analytical difficulties were noted in lawn fertilizers containing a natural organic, such as activated sewage sludge, along with urea. Analyses were consistently a fraction lower than expected in water-soluble organic nitrogen. Were the analytical

methods at fault or was part of the organic nitrogen converted to ammoniacal nitrogen in the manufacturing process?

To find the answer, blends of ingredients were made in the Nitrogen Division laboratory and 8-6-4 and 10-6-4 were produced on a small scale for testing. Standard analyses were made and separate direct analyses were run for urea. Samples contained practically all of the expected urea. Even when samples were kept for a month at 122°F. the urea nitrogen content had decreased only slightly.

These tests showed that an *apparent* loss of organic nitrogen, with offsetting higher values of ammoniacal nitrogen, was due to conversion of part of the urea to ammonia during the analysis and, to a slight extent, by conversion of some natural organic to ammonia. It was found that these discrepancies could be minimized by close attention to analytical detail. For best results, a milder procedure for determining ammoniacal nitrogen was recommended.

In the direct determination of urea content, the basic procedure involves the enzyme urease which splits urea into ammonia and carbon dioxide. Nitrogen Division chemists have found a simple way to apply this procedure to mixed fertilizers, avoiding the interference generally caused by phosphate.

These are only a few of the many ways that Nitrogen Division chemists are working to improve old analytical procedures and devise new ones as required. With fertilizer technology now in a state of rapid change, continuing research is vitally important in solving the problem of meeting minimum guarantees.



200 NEW TANK CARS. To expedite delivery of Nitrogen Solutions to mixed fertilizer plants, Nitrogen Division, Allied Chemical, is adding 200 new units to its large fleet of tank cars. All of these new cars, made of aluminum and especially designed for handling all types of Solutions, will be in service this month. Another way that Nitrogen Division, Allied Chemical, is constantly expanding its facilities and improving its service to customers.

HERE'S THE BIG LINE OF

Arcadian

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water		Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

**Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer
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TECHNICAL SECTION



Use of Magnetic Meter for Metering Viscous Fluids

Comments by W. I. Strauss, Foxboro Co., Foxboro, Mass., at the Fertilizer Industry Round Table, Washington, D. C., November, 1957

IN the manufacture of wet process phosphoric acid, the measurement of the phosphoric acid can be handled readily by the magnetic flow meter*, resulting in increased yield through better process balancing. Concentrated sulfuric acid and phosphate slurry are measured and controlled using the Foxboro Magnetic Flow Meter as the primary device. Crystal size can be better controlled through a combination of correct flow measurement and laboratory analysis. This holds filtration problems to a minimum. Previously, measurement of these viscous materials (concentrated sulfuric acid and phosphoric acid), corrosive fluids (phosphoric acid and sulfuric acid of various concentrations) and slurries (phosphate slurries) were both a maintenance and measurement problem. Orifice plates of special design and metal were required, or the expensive venturi tubes were used. High maintenance seal systems and complex purge systems were employed.

As in the flow measurements for the wet process system, phosphoric acid by the furnace process has a common measurement problem. The phosphoric acid is of approximately the same concentration as the wet process acid; therefore, the viscosity problem is the same. As the ambient temperature approaches 32° F., the viscosity changes rapidly. This would cause a significant error of flow measurement using conventional type flow meters.

The application of the magnetic

flow meter for phosphoric acid affords accuracies to $\pm 1\%$ full scale with maintenance problems kept at a minimum. There are no seals or purges required. The meter measures volume rate of flow directly, such as gallons per minute, therefore turbulence or changes in viscosity have no effect on the instrument from an application or measurement viewpoint.

The principle of operation of this meter is not new. It is based on Faraday's well-known law of electromagnetic induction; the voltage induced in a conductor of a given length moving through a magnetic field is proportional to the velocity of the conductor. The voltage is generated in a plane which is mutually perpendicular to both the velocity of the conductor and the magnetic field.

A uniform magnetic field is induced through a portion of the flow tube (which is essentially a piece of pipe) by a coil outside the tube. The flowing liquid itself is the conductor moving through the magnetic field. Consider a cross-section through a cylindrical column of liquid which is a flat disc. As the flat disc is moved through the magnetic field, a voltage is developed. If a pair of electrodes is inserted in the tube wall in the proper relation to the magnetic field, this voltage can be measured. Length of the conductor becomes the distance from one electrode to the other; that is, the flow tube diameter.

The meter actually adds incremental velocities across the tube from one electrode to the other. It can be seen that turbulence or variation in

flow profile due to flow rate or viscosity does not affect accuracy since the generated voltage is proportional to velocity. This permits installation of the flow meter adjacent to control valves or pipe elbows. This can not be done with conventional flow measurement devices if reasonable accuracies are required.

If air bubbles or other material are entrained in the liquid, the meter will read the volume rate of flow of the total mixture. It is only necessary to have the tube completely filled with a homogeneous mixture at all times.

The basic requirement for the flowing fluid is that the fluid have a minimum conductance of approximately 200 micromhos in line sizes to 6" and 50 micromho in large line sizes.

Various lining materials can be furnished to meet corrosive conditions. Neoprene, Kel-F and Teflon materials and glass are standard liners. Many types of electrode materials are also available for the same reason. Type 316 stainless steel, platinum, Hastelloy C Alloy, nickel, Monel Alloy and tantalum have been used. The maximum operating temperature is presently 365°F., but experiments are under way to increase this—possibly as high as 600°F.

The flow transmitter signal is recorded by a Foxboro Magnetic Flow Dynalog Instrument, calibrated in units of flow.

The March issue of "Agricultural Chemicals" will carry a discussion on meeting high vapor pressure liquids, including anhydrous ammonia.

*Foxboro Magnetic Flow Meter made by Foxboro Co., Foxboro, Mass.

LITERATURE AVAILABLE

The following list reviews a series of bulletins on fertilizer, insecticide, and fungicide recommendations, controls, etc. Bulletins are available from agencies indicated.

COTTON PRODUCTION — INSECT AND DISEASE CONTROL, SOUTH CAROLINA — 1956. Taking into consideration that one of the major problems in South Carolina is the need to increase per acre yields of high quality cotton, the authors make recommendations in all phases of cotton agriculture, stressing cotton insect and mite controls. Methods of fairly accurate infestation counts are described, plus a full description of pesticides for emergency controls. Circular 413, February 1956, Clemson Agricultural College, Clemson, South Carolina.

MAINE FARM RESEARCH—A QUARTERLY PROGRESS REPORT, April, 1956. This 24-page quarterly, with extensive photographs, contains six articles by Maine agricultural experts on a variety of subjects. Among the articles are reports on control methods for fly pests, potato insects, and red leaf disease of blueberries. The importance of soil and plant tissue analyses to guide efficient fertilizer use is also stressed. Published by the Maine Agricultural Experiment Station, University of Maine, Orono, Me.

GROWING CANTALOUPE IN ARIZONA, by W. D. Pew, R. B. Marlatt, and L. Hopkins. 24 pages of comprehensive information covering the particular and general problems of growing this crop in Arizona, this booklet reports that nitrogen is the most important nutrient in cantaloupe production. It discusses planting dates, soil selection and management, spacing, irrigation, pollination, harvesting, insects and diseases. Bulletin 275, May, 1956. Agricultural Experiment Station, University of Arizona, Tucson.

FIELD AND EXPERIMENTAL OBSERVATIONS ON CURLY-TOP AFFECTING VEGETABLE CROPS — VIRUS DISEASES OF PLANTS IN ARIZONA II, by Paul D. Keener. A 28-page bulletin, with photographs and diagrams, describing how yield and quality of the product of an infected plant may be impaired by curly-top virus. It discusses in detail infestation, life history, carriers, and control measures. Bulletin 271, February, 1956. Agricultural Experiment Station, University of Arizona, Tucson.

A METHOD FOR IDENTIFYING CYCLAMEN MITE DAMAGE ON NORTHWEST VARIETY STRAWBERRY PLANTS. This four-page bulletin describes the methods and difficulties in identifying the damage of this pest that has become a major threat to strawberries in the Pacific Northwest. Though not particularly harmful to the Marshall variety of strawberry, the cyclamen mite's favored host is the Northwest variety introduced in 1949.

Extension Circular 261, May 1956. The State College of Washington, Pullman, Wash.

AN ECONOMIC EVALUATION OF WEED CONTROL PRACTICES IN THE DELTA. This seven-page circular summarizes some of the results of two series of field experiments begun in 1954 to study the cost of weed control in cotton and the total cost of cotton production with and without recommended weed control practices. In the cost of production studies, use of chemicals reduced weed control labor by approximately 80%. Striking reductions in harvest labor were obtained through a completely mechanized production program. Circular 203, March 1956. Agricultural Experiment Station, Mississippi State College, State College, Miss.

STORAGE OF PEA BEANS IN MICHIGAN AND INDIANA, by Judson A. Thompson and John S. Perry. A study of pea bean storage was made to determine what factors are most important for maintaining quality, preventing the formation of harmful molds and discoloration, and controlling insects in beans which are to be held in storage for a period longer than one marketing year. These tests were carried out under controlled conditions in the laboratory and under actual commercial practices. AMS No. 123, May, 1956, U. S. Department of Agriculture, Agricultural Marketing Service, Washington, D. C.

RESPONSES OF COTTON TO 2,4-D, by Harry Carns and V. H. Goodman. This 15-page bulletin describes the effect of 2,4-D on cotton growth, yield, fiber, and seed properties as revealed in a series of five tests during a period from 1950-53. Applications of 2,4-D ranging from 0.001 to 0.1 pound per acre were made on cotton at four general stages of plant development. Bulletin 541, April, 1956. Mississippi State College Agricultural Experiment Station, State College, Mississippi.

DOGWOOD BORER — PESTS OF ORNAMENTALS, by John C. Schread. One of a continuing series on research conducted to control pests on ornamentals, this four-page circular describes the dogwood borer, which is a serious pest of trees planted within 300 feet of an existing infestation. It describes preparation of DDT, dieldrin, and lindane, principal insecticides used in fighting the borer. Circular 199, June 1956. The Connecticut Agricultural Experiment Station, New Haven.

SCREENING TESTS OF ESTERS OF PIPERONYL ALCOHOLS AS INSECTICIDES, by W. F. Barthel and S. I. Gertler. Features of this eight-page leaflet are two tables, one on the esters of piperonyl alcohols and another on screening tests for the alcohols with various important insect pests. The authors, on the staff of the Entomology Research Branch of the USDA, also list toxicants for these insects. ARS-33-27, July 1956, Agricultural Research Service, USDA, Washington.

Corn Borer Control

In order to determine the effectiveness of treatments for European corn borers in Indiana, where populations have seldom been high enough to justify large expenditures for control, tests were conducted in 1956 on sweet and field corn with granulated insecticides.

One application of granulated formulations of several insecticides gave excellent control of first generation European corn borer larvae in field corn and fair control in sweet corn. On sweet corn, endrin and dieldrin granulated formulations were better than DDT or heptachlor, but were not as good as two applications of DDT spray.

On field corn, dosages per acre of 0.2 pounds on endrin, 0.5 pounds of heptachlor, 0.4 pounds dieldrin, and 1 pound aldrin were as good as 1 pound of DDT applied as a spray.

None of the treatments had any influence on the second brood populations.

Granulated Insecticides for European Corn Borer Control by George E. Gould and M. Curtis Wilson, Purdue University Agricultural Experiment Station, Lafayette, Indiana. Pages 510, 511. *Journal of Economic Entomology*, Volume 50, No. 4, August, 1957.

Dow Chelate Changes

A new chelating compound as well as new names for its entire chelate line have been announced by the Dow Chemical Co., Midland, Mich.

The new product is Versenol Z, designed for curing zinc deficiency in avocado orchards or deciduous trees of the northwest.

New names applied to chelate products will retain the Versenol and Versene trademarks but will be simplified. Under the new monomenclature, Versenol Iron Chelate will be known as Versenol F, Versenol Iron Chelate on Vermiculite will be Versenol FA, Versene Iron Chelate will be Versene F, and Versene Iron Chelate on Vermiculite will be known as Versene FA.

Tabutrex Field Tests

The Glenn Chemical Co., Chicago, reports that claims for repelling horse flies can now be made for livestock sprays and backrubber formulations containing Tabutrex insect repellent. Field tests conducted by the company over the past several seasons are said to have produced impressive results against this troublesome biting pest.

In the same series of tests, Tabutrex's performance against the stable fly and horn fly continued to be of a high order, according to Glenn.

Test data obtained from the studies indicate that the level of Tabutrex could be reduced from 1 per cent to as little as .50 per cent, in combination with approved knock-down insecticides, with no loss in effectiveness. In addition, practical pasture protection from horse flies and stable flies was achieved by dairy farmers consistently with such formulations throughout the fly seasons.

Beef cattle also received attention from Glenn during the studies. By adding Tabutrex to the insecticides normally used in backrubbers, the company reportedly has developed the first control measure to which horse flies have succumbed on the range.

Direct Farm Application of Acid to Rock Phosphate

Treating rock phosphate in the field with phosphoric or sulphuric acid has recently been tested on an experimental basis, with a moderate degree of success, by agronomists at the University of Missouri, Columbia, Mo. The program was initiated by an agronomy student working on a laboratory problem who found that a high degree of conversion of phosphorous in rock phosphate could be obtained by spraying acid on a surface application of phosphate rock.

Subsequently, field trials were made on corn and small grain. Results with corn were not significant, since a shortage of moisture subsequent to the treatment period limited yield. However, on wheat the results seemed promising. In one experiment on a low phosphorous soil during the '57 growing season a sixteen bushel increase in yield was obtained from

the application of only 72¢ worth of sulphuric acid to rock phosphate.

The work has been conducted under the supervision of George E. Smith, Professor of Soils, who suggests that the process can probably be used by custom applicators in areas where acid is available on a favorable cost basis. Crop response, he feels, will be adequate to justify the expenditure. He feels however, that commercial use of the process will probably have to await the development of machinery that will permit application on a field basis. Field work to date has been conducted only on small plots using hand application.

Ammonium Nitrate on Sugar

A method has recently been worked out in the laboratories of the Hawaiian Sugar Planters Association which makes it possible to use ammonium nitrate for the fertilization of sugar cane. Ammonium nitrate has been considered to be a highly desirable fertilizer for cane, but it has been impractical to use it up to now because it is highly corrosive when shipped in steel containers, and there is an explosion hazard in the dry form.

The solution to the problem, as worked out by Dr. Francis E. Hance, head of the chemistry department at the HSPA Experiment Station, was to add aqua ammonia to a concentrated solution of ammonium nitrate, the ratio by volume being 80% ammonium nitrate and 20% aqua ammonia.

The resulting mixture is slightly volatile, and requires an enclosed container, although it need not necessarily be airtight. The portion of the container above the liquid line is protected from corrosion by the ammonia vapors given off, and there is no corrosion below the liquid line, where the solution itself contacts the metal.

Study of Citrus Red Mite

In studies with the citrus red mite at the Whittier, Calif., laboratory, purified air was found to be essential in rearing this mite. A unit for rearing mites is described in USDA Bulletin ARS 33-39, by Francis Munger, USDA, Entomology Research Division.

INDUSTRY PATENTS

2,753,252. FERTILIZER MANUFACTURE. Patent issued July 3, 1956 to Marion D. Barnes, El Dorado, Ark., assignor, by mesne assignments, to Monsanto Chemical Co., St. Louis, a corporation of Delaware. Process of producing phosphatic materials, which can be dissolved in neutral ammonium citrate solution, and ammonium nitrate which comprises reacting nitric acid with calcium-phosphorus containing material, removing substantially all of the free water and water of hydration from the resulting solution, mixing the resulting residue with anhydrous ammonia and thereby obtaining a mixture comprising calcium nitrate dissolved in the anhydrous ammonia and undissolved phosphatic materials, separating out the phosphatic materials, reacting the anhydrous ammonia solution of calcium nitrate with ammonium carbonate in aqueous solution and thereby obtaining a precipitate of calcium carbonate and a solution of ammonium nitrate, and separating out the calcium carbonate.

2,754,242. PROCESS OF COMBATING INSECTS UTILIZING PHOSPHINATES. Patent issued July 10, 1956 to Gennady M. Kosolapoff, Auburn, Ala., assignor to Monsanto Chemical Co., St. Louis, a corporation of Delaware. The process of combating insect pests which comprises applying to said pests an alkyl bis(parachlorophenyl) phosphinate wherein the alkyl group contains between 1 and 4 carbon atoms.

2,756,233. FUNGICIDES AND METHOD OF MAKING SAME. Patent issued July 24, 1956 to Stanley B. Elliot, Walton Hills, and Albright M. Nicholson, Cleveland, Ohio, assignors to Ferro Chemical Corp., Bedford, Ohio, a corporation of Ohio. 1. The method of producing a composition of matter which consists of reacting at temperatures between 200° F. and the lowest decomposition temperature of the reactants, hydroxyquinoline, with at least one water insoluble metal organic acid soap, said metal soap selected from the group consisting of the metal water insoluble soaps of stearic, palmitic, lauric, 2-ethyl-hexanoic, linoleic, linolenic, oleic, ricinoleic, naphthenic, tall oil, rosin oil, rosin and abietic acids and an alkyl phenol in which the alkyl group has at least 8 and not more than 15 carbon atoms.

7. As a new composition of matter the product produced by claim 1.

2,757,047. PLANT FOR THE DISTRIBUTION OF FERTILIZER LIQUOR. Patent issued to Giovanni Friedmann, Milan, Italy. In an irrigation system of the type described, including a main water supply pipe and a throttling valve in said main water supply, means for adding liquid manure to the irrigation water comprising a primary bypass around said throttling valve, an ejector in said bypass taking suction from a source of liquid manure, and a valve controlled secondary bypass around said injector.

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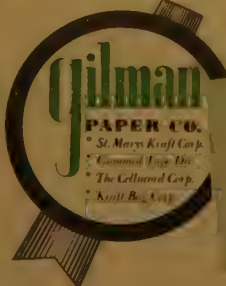
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- 2 Is your bag properly constructed for your product?
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- 4 Is the total cost of your bag out of proportion to the selling price of your product?
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- 6 Are you using the most economical filling machine available for packaging?
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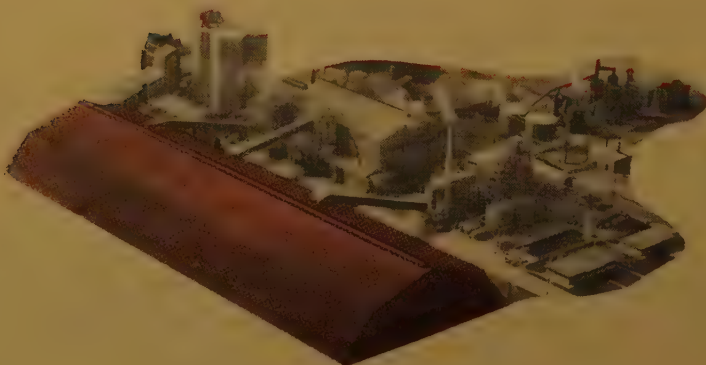
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INTERNATIONAL MINERALS

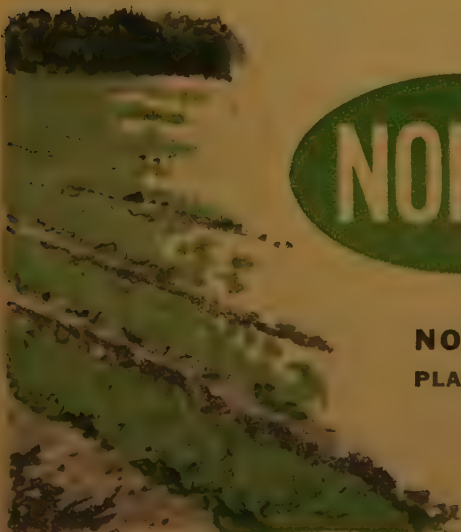


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PHOSPHATE CHEMICALS DIVISION

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**NOPCO****PRESENTS**

A New and Versatile Organic Thiophosphate Emulsifier System

Excellent performance at economically low emulsifier levels

Proper blends of Nopco Agrimul N4R and Nopco Agrimul N4S insure excellent emulsion performance in Malathion, Parathion, Methyl Parathion, and a wide range of other thiophosphate toxicant concentrates. Regardless of water conditions, concentrates can be carefully adjusted for spontaneity and tightness of emulsion.

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Bring your formulation problems to Nopco's research center at Harrison, N. J., or Richmond, Calif. We are waiting to show you how Nopco Agrimuls can provide new efficiency and economy to your operation. Simply write or telephone.

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Anhydrous Ammonia
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 You can always rely on Phillips 66 premium fertilizer materials for your high-quality mixtures these four ways:

Years of experience and know-how go into each run of Phillips 66 chemical fertilizer materials.

Phillips 66 has a continuing program of research to improve and maintain high standards of quality.

Rigid control from raw materials to finished products insures constant uniformity.

Extreme care in loading and shipping in clean cars assures you of high purity on delivery.

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CARRICLAY, Magcobar's LVM grade Attapulgate, is ideal for the formulation of high concentrate granulars where a slow toxicant release is desired.

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NEWS about the TRADE



Mackay Joins Hubbard-Hall

F. Herbert Mackay, formerly vice president of Olds & Whipple, Inc., Hartford, Conn., has joined the agricultural division of the Hubbard-Hall Chemical Co., Waterbury, Conn.



F. Herbert MacKay

Mr. Mackay will be concerned chiefly with the purchase, production, and sale of fertilizers designed for growing tobacco. He makes his headquarters at Hubbard-Hall's Waterbury office. With Olds & Whipple since 1947, Mr. Mackay was in charge of fertilizer production and materials purchasing.

To Blend Finished Dusts

The Planters Chemical Corp., Norfolk, Va., will start a new operation to blend finished dusts at Fayetteville, N. C.

The facilities at Fayetteville consist of a brick building 50 by 200 feet. Production is expected to start in April. Bayard E. Swayne will be in charge of the operation.

The Planters Chemical Corp. is celebrating its 50th year in agricultural chemicals in the Virginia-North Carolina area.

Noonan Joins Velsicol

Richard E. Noonan was appointed marketing specialist by the Velsicol Chemical Corp., Chicago,

last month. He will devote his efforts to the merchandising of Chlordane.

Mr. Noonan will headquarter at Velsicol's Chicago office but will travel extensively to assist formulators, distributors, and dealers in their own promotion efforts on Chlordane.

Aviation Conf. Feb. 26-27

The seventh annual Ohio-Indiana Agricultural Aviation Conference will be held February 26-27 at Ohio State University. Further information on the meeting is available from Howard B. Taylor, Ohio State University Airport, 3130 Case Road, Columbus 21, Ohio.

Illinois Spray Operators School

The 10th annual Illinois Custom Spray Operators School will be held January 23-24 on the campus of the University of Illinois at Urbana, under the direction of H. B. Petty, extension entomologist.

On the program for Jan. 23rd will be a discussion of the effect of giant foxtail on corn and soybean yields by J. W. Pendleton, Univ. of Illinois agronomist. Also scheduled is a report on Simazin, pre-emergence herbicide for corn, by F. W. Slife, the University's weed control specialist.

A discussion of mosquito control, led by P. B. Brockway, will be a feature of the January 24th program.

New Calspray Sales Rep.

Jerry A. E. Knopf has just joined California Spray-Chemical Corp. as a sales representative, working out of the Calspray office in Blythe, Calif. He holds an M.S. in entomology from Colorado State Univ., where he has been a graduate research assistant before joining Calspray.

Rejoins Hercules Naval Stores

Richard T. Yates has just been named director of sales of the Naval Stores Department of Hercules Pow-



Richard T. Yates

der Co., returning to the department after reassignment for the past year investigating possible new fields of chemical production for the company.

Hercules had announced last year that it was going to build a plant at Louisiana, Mo., to manufacture methacrylate, a joint venture with Imperial Chemical Industries, Ltd., and Mr. Yates was to have been president of the new subsidiary, Hawthorn Chemical Corp. However, A. E. Forster, president of Hercules Powder, has just announced that it has postponed indefinitely, plans to manufacture methacrylate, because "after careful study . . . the project is currently unattractive to us."

Mr. Yates joined Hercules in 1929 following graduation as a chemical engineer from Virginia Polytechnic Institute. He was manager of the Agricultural Chemicals Division of Hercules' Naval Stores Department before his recent assignment.

Grace To Build In Trinidad

W. R. Grace & Co., New York, has begun soil-boring tests as a preliminary move in the construction of a fertilizer plant in Port of Spain, Trinidad. Actual construction will begin in March.

The plant, which will produce fertilizer from natural gases, is expected to be completed in 15 months. The Trinidad company will be called Federation Chemicals, Ltd.

New Texas Fertilizer Plant

A new fertilizer plant is under construction in Littlefield, Texas, which when completed will have an annual capacity of 30,000 tons of fertilizer, to be marketed throughout eastern New Mexico and western Texas. The plant, to cost about \$200,000, will operate under the name of Caprock Fertilizer Co.

Peter Gowan will manage the new operation, with C. M. Schultz as sales manager. The Caprock firm is owned by Longhorn Construction Co., Sulphur Springs, Texas. Partners in the latter firm are W. S. and C. H. Tyler and A. E. Neumann.

Arkansas Plant Operating

The Farmer's Liquid Fertilizer plant at Patterson, Ark., installed by the J. C. Carlile Corp., Denver, Colo., started operations last month.

The plant employs a combination aqua ammonia converter-ammonia phosphate cooler with a reactor circuit. The circuit is modified to incorporate the use of superphosphoric and wet process acids.

Named Research Director

Dr. W. Mayo Smith has been appointed director of research for the Escambia Chemical Corp., New York.

Dr. Smith had been assistant director of research in charge of polymerization and plastics research and development since 1956. Escambia's research and development activities are now conducted at Cambridge and Newton, Mass., but will be moved late this spring to the new Escambia Research Center in Wilton, Conn., where Dr. Smith will be in charge.



E. W. Harvey

E. W. Harvey Retires

E. W. Harvey, one of the pioneers in the introduction of nitrogen solutions, has retired from the Nitrogen Division of Allied Chemical & Dye Corp., New York. He was with Allied Chemical for 39 years.

During his career with Allied, Mr. Harvey worked on the agronomic, technical, and sales aspects of the fertilizer industry. He is especially noted for his work in the technical aspects of using nitrogen solutions in fertilizer mixing and for direct application. He was director of technical service for the Nitrogen Division when he retired. He is now devoting his time to managing his fruit and dairy farms in Cream Ridge, N. J.

DuPont Executive Retires

Edward A. Orem, assistant director of sales of the Grasselli chemicals department of E. I. du Pont de Nemours & Co., Wilmington, Del., has retired after 43 years with the firm.

Ban Methoxychlor On Cows

The Food and Drug Administration has ruled against the application of methoxychlor to dairy cows when the method employed leaves residues in milk.

The action, which has the effect of outlawing the use of methoxychlor to keep cows free from flies, was in the form of a regulation setting a zero tolerance for methoxychlor in milk.

The FDA's action was on a petition by E. I. du Pont de Nemours & Co., Wilmington, Del., requesting a tolerance of 0.25 part per

Kansas Aerial Applicators Assn.

The Kansas Aerial Applicators Association was organized at a meeting held recently in Liberal, Kans., and attended by 22 of the state's 84 aerial applicators. Bonnie Thompson of Liberal was elected president, and B. L. Hinman of Plains, vice-president. Mrs. Thompson will act as secretary-treasurer.

First major project of the new group will be to seek a change in a Kansas law placing unlimited liability on a company bonding a pesticide applicator. Under this stringent law aerial applicators have been unable to obtain bonds, and they are not permitted to work unless bonded.

Seek Tolerance For Maneb

A petition has been filed with the Food and Drug Administration by E. I. du Pont de Nemours & Co., Wilmington, Del., for a tolerance for residues of Maneb of 25 parts per million on apricots and certain vegetables and seven parts per million on certain other vegetables.

Asst. Administrator for A.R.S.

Dr. Herman A. Rodenhiser has just been named to succeed Dr. Karl S. Quisenberry as assistant administrator for farm research in the Agricultural Research Service of the U. S. Department of Agriculture. Dr. Quisenberry retired from Government service January 31.

million for methoxychlor in milk to permit use of the pesticide as a fly spray on dairy cattle.

A committee, headed by Dr. Herbert E. Longenecker, vice president of the University of Illinois, was named by the FDA to consider the petition and to make a report and recommendations. The committee reported that the data on safety were inadequate to justify the establishment of a tolerance. Summarizing their position, the committee pointed out the long-standing policy of the FDA and food officials of all states that no poisonous or deleterious substance should be sanctioned in milk.

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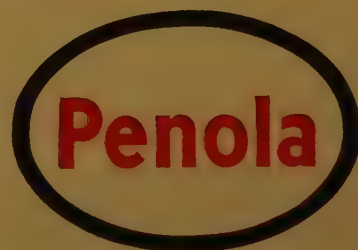


Here's why Penola HAN heavy aromatic naphtha should be used in your pesticides:

It is . . . ● LOW in cost ● HIGH in solvency ● BLENDS readily with active ingredients.

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Use Penola HAN for top quality herbicides, too. Penola HAN is marketed by the Penola Oil Company, distributor of Flit — the greatest name in insecticides. For information on how Penola HAN can improve *your* product, call us today.



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AGRICULTURAL CHEMICALS

CSC Names Bennett to Sales

Frank M. Bennett has joined the agricultural chemicals department of Commercial Solvents Corporation as a sales representative. He will make his headquarters at CSC's district office, Cincinnati, O. Mr. Bennett will service fertilizer manufacturers in the state of Kentucky and portions of Ohio, concentrating on sales of Hi-D solid ammonium nitrate, Dixsol nitrogen solutions, and other CSC nitrogen products.

Mr. Bennett, who is a native of Baltimore, Maryland, graduated from William & Mary College. Before joining CSC, he represented Virginia-Caroline Chemical Corp.



Soils Extension Course

The University of California is sponsoring a Soils and Plant Nutrition extension course which is open to fertilizer salesmen, dealers, agriculturalists, and all other persons interested in soil fertility and plant nutrition.

The course is being given on the Davis campus of the university and in Modesto. Among the lecture topics are; mineral nutrition of plants, soil chemistry of the plant nutrients, biological and organic components of soil, nutrient deficiencies and determination of fertilizer needs, and soil tests.

Textbooks for the course are the Western Fertilizer Handbook, published by the Soil Improvement Committee of the California Fertilizer Association, and Soil, the 1957 yearbook of Agriculture, published by the U.S. Department of Agriculture.

Georgia Plant Food Meeting

The Georgia Plant Food Educational Society, together with the Georgia section of the American Society of Agronomy met January 14-15 at the University of Georgia, Athens.

Of particular interest was a discussion on "How Big is the Fertilizer Market in Georgia," with the answer somewhere in the 200 million dollar bracket. G. L. Dozier, Cotton States Fertilizer Co. presented the manufacturer's viewpoint; Byron Dyer, considered the county agent's viewpoint; J. H. Wyatt presented the dealer's viewpoint, Sam Neville, the farmer's viewpoint.

Other reports dealt with some preliminary results in treating forage plants with gibberellins; effect of sources and rates of lime on pH values and forage yields; and problems specific to Georgia agriculture.

New Potash Mine in Carlsbad

Farm Chemical Resources Development Corp. are digging a new cavern near Carlsbad for potash ore. The company will mine and mill potash for use as a soil builder in agriculture. Farm Chemical's block of mining leases, totaling more than 9,000 acres, is in the vicinity of Eddy-Lea county line.

The new firm is composed of Kerr McGee, National Farmers' Union, and the Phillips Petroleum Co.

Raymond Bag Advances Execs.

F. D. Gottwald, president of the Albermarle Paper Manufacturing Co., has announced the following changes in the executive organization of the firm's Raymond Bag Corp. Division at Middletown, Ohio:

Clarence L. Mers, who has been president of the Raymond Division since its incorporation two years ago, has been elected chairman of the Board.

J. R. Clements, who became the new president at Raymond, has been associated with the bag industry for some 24 years. He joined Albermarle in 1952 as midwestern district manager for the firm's Multiwall Division. He was made sales manager of the division the following year. He was then elected vice president in charge of sales when the new Raymond corporation was formed in 1955.

Pennsalt Sales Manager

Donald E. Hope has been appointed to the position of Northern Manager of Agricultural Chemicals for the Pennsalt of Washington Division of Pennsalt Chemicals Corp., Tacoma, Wash.

Mr. Hope, who joined Pennsalt in 1950, has been agricultural chemicals district sales manager of the Northeastern and mid-Atlantic states since 1956. He will make his headquarters in Aurora, Ill.

Potato Growers Convene

Suffolk and Nassau County potato growers heard the latest scientific finding on the production and marketing of potatoes at the 26th annual Long Island Potato Growers' Convention held in Polish Hall, Riverhead, L. I., January 28 and 29. The two-day convention of Long Island's 21 million dollar potato industry was sponsored by the County Potato Committee of the Suffolk County Agricultural Extension Service. Potato Committee chairman John A. Hartmann of St. James, and vice-chairman David H. Young of Aquebogue, alternated in presiding.

Chase Names Three

The Chase Bag Company Paper Bag Division, New York has appointed three new territory sales managers. Named were P. E. Nelson, Southeastern Sales Manager in Atlanta; Bill Sheets, Midwestern Sales Manager in Chicago, and K. L. Moore, Eastern Sales Manager in Buffalo.

Mr. Nelson has been manager of the New Orleans sales office for this multi-plant packaging firm since 1956. Mr. Sheets became a specialist in multiwall sales for Chase in Chicago last year, and Mr. Moore joined the firm in 1956 as a multiwall sales engineer in Buffalo.

Systems to Calcine PO₃ Rock

Two Western fertilizer producers recently announced decisions to install Dorrco FluoSolids Systems to calcine phosphate rock at new plants in Idaho and Wyoming. Presently under construction and scheduled to go into operation in 1958, the Georgetown, Idaho plant of Central Farmers Fertilizer Co. will employ a fluidized system to handle 25 tons of phosphate rock per hour. Organic materials which interfere with processing steps later in the flowsheet will be burned off in this operation.

As the result of extensive and successful field tests with a fluidized pilot plant, San Francisco Chemical Company has purchased a two-Reacto FluoSolids Systems to calcine 1000 tons per day of phosphate rock at their Leefe, Wyoming plant.

GRAFLOW means . . .

- reduced caking
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GRAFLOW (Trade Mark)

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CONDITIONING AGENT

Here is the new conditioner that can give any pulverized or granular fertilizer a number of advantages. First, in your own plant, GRAFLOW will reduce corrosion of your handling equipment, because it is chemically inert. It will mix and coat evenly because it is basically high quality graphite . . . one of nature's finest lubricants. In addition, GRAFLOW has high coating power. The inert graphitic film isolates fertilizer particles from one another, lowering inter-granular friction. Thus, you benefit two ways with GRAFLOW: your own plant handling is aided, and your product gains greater acceptance. This is a new product, well worth an inquiry for details . . .



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222

THE UNITED STATES GRAPHITE COMPANY

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Nitrogen Fertilizer in Midwest

Feature of February, 20-21 Meeting

A three-day session highlighting the importance of nitrogen fertilizer in Midwestern agriculture gets underway at the Lowry Hotel in St. Paul, Minn., Feb. 20. The Nitrogen Conference is expected to attract some 1,000 fertilizer industry representatives, college and USDA personnel and farmers from the Upper Midwest.

Serving as co-chairmen will be Dr. W. P. Martin, head, university of Minnesota Soils Department, and J. W. Hicks, International Minerals & Chemical Corp.

The conference is being sponsored by the University of Minnesota and the Midwest Regional office of the National Plant Food Institute. Keynote speaker at the opening session on Feb. 20 will be Dr. Malcolm H. McVickar, California Spray-Chemical Corp., who will speak on "How Can We Work as a Team To Put Soil Fertility Facts To Work On the Farm."

A six-man panel will discuss "Our Part in Getting the Job Done," to conclude the opening-day session. Panel members include Dr. Martin; Roland Abraham, Minnesota Agricultural Extension Service; Proctor Gull, Spencer Chemical Co.; A. C. Hartzler, Kansas State College; Leslie Boler, Winnebago, Minn. farmer; and Richard Bird, Goodhue County banker.

A panel will discuss "The Role of Nitrogen in Production Potentials" at the afternoon session on Feb. 21. Panel speakers include: Dr. J. M. MacGregor and Paul M. Burson, Minnesota soil scientists; Dr. R. A. Young, North Dakota Agricultural College; and Dr. M. R. Teel, Purdue University.

Other speakers and their topics for the meeting include: Dr. George D. Scarseth, American Farm Research Association, "Nitrogen — Our Big Need;" Dr. George Blake, University of Minnesota, "Nitrogen, Soil Or-

ganic Matter and Soil Structure;" Dr. E. L. Schmidt, University of Minnesota, "Nitrogen and the Life of the Soil;" and Dr. A. C. Caldwell, University of Minnesota, "Don't Forget Phosphorus, Potash and Lime."

Two reports, one on "Nitrogen Availability Measurements in Soils" and "Industry's Program for Getting the Job Done" will be given by Dr. John Grava, University of Minnesota and Laurie Peterson, Midland Cooperatives, Inc., respectively.

Zenas H. Beers, NPFI Midwest regional director, will represent the Institute at the conference and will serve as chairman at the afternoon session on Feb. 21.

Nominations for Wiley Award

Frank A. Vorhes, Jr., President of the Association of Official Agricultural Chemists, announced that nominations are now being accepted for the second annual Harvey W. Wiley Award for achievement in analytical methods. This award, which consists of \$500 in cash, goes to the scientist who makes an outstanding contribution to the development of methods of analysis for foods, drugs, cosmetics, feeds, fertilizers, and pesticides, or for use in general analytical chemistry. These are the fields of interest of the AOAC, encompassed in its publication, *Official Methods of Analysis*. This thousand-page book is the primary laboratory manual of regulatory chemists and research

New Bradley & Baker Rep.

Mr. Arthur G. Riddell, Jr. has recently joined Bradley & Baker as a sales representative in the Middle West in the fertilizer department of the well-known firm. He will cover the states of Illinois, Indiana, Ohio and Wisconsin.



Mr. Riddell, who will make his home in St. Louis, Missouri, was formerly associated with the Bag Division of the Virginia-Carolina Chemical Corporation.

workers in agriculture in the United States and throughout the world.

Nominations must be submitted by April 1, 1958. Nominees need not be members of the Association. A general statement regarding the award may be obtained from the Secretary, William Horwitz, Box 540, Benjamin Franklin Station, Washington 4, D. C.

Dow Highway Program Film

A motion picture aimed at creating public understanding of the \$51-billion Federal Interstate Highway program will be released by the Dow Chemical Company for general showing about February 15.

The film "Highway Hearing," was developed in cooperation with highway authorities at the national, state and local levels. It is designed to help the public understand the aims and benefits of the nation-wide program.

The Federal Highway Act of 1956 provides for public hearings whenever a segment of the interstate system by-passes or passes through a city, town or village.

The film portrays a typical public hearing in a typical community and highlights the reactions of the residents to the proposed local highway situation in terms of their personal interests.

Expands Midwest Sales Staff

B. Gene Carter joined Velsicol Chemical Corp., Chicago, sales staff in the Midwest during 1957 as technical sales representative. He received his B. S. in Entomology from Texas A. & M. In making the announcement, Roger W. Roth, agricultural chemicals division sales manager, pointed out that Mr. Carter is responsible for sales of Velsicol's insecticides and solvents in Ohio, Kentucky, Michigan, West Virginia, and the western portions of Pennsylvania and New York. Carter is headquartered at 347 Kimberly Avenue, Columbus, Ohio. The company's insecticide line includes technical endrin, chlordane, heptachlor, parathion, and methyl parathion..

THIS IS ANOTHER ADVERTISEMENT IN
THE CONTINUING MONSANTO CAMPAIGN
TO HELP YOU SELL LION AMMONIUM NITRATE



Your crops need all the nitrogen a soil test indicates... USE LION BRAND AMMONIUM NITRATE

Nitrogen is the growth nutrient that builds big, healthy productive plants. And Lion brand Ammonium Nitrate fertilizer, containing 33.5% nitrogen, supplies *two* important kinds of plant nitrogen... quick-acting and long-lasting... to give your plants a fast start *and* maintain steady growth.

Test your soil to learn how much nitrogen and other plant foods you need for your crops. Then figure how much and what kind of fertilizer is necessary to supply these

needs. Your local agricultural advisors will help you.

Apply the full amount of proper mixed fertilizer and Lion brand Ammonium Nitrate your soil test indicates. Don't skimp—fertilizer is the least-expensive item you use for crop production.

See the results when your crops get all the nitrogen they need for peak yields. You'll be glad you used low-cost, Lion brand 33.5% nitrogen fertilizer. Look for the Lion on the bag at your favorite fertilizer dealer.

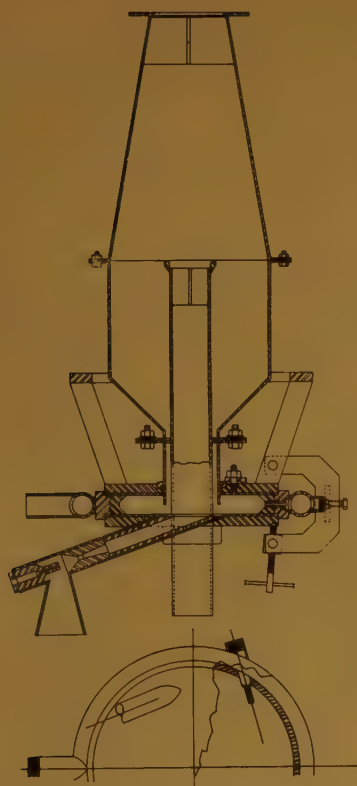


This year Lion brand is better than ever... more uniform in size... can't cake when stored properly. Look for it in the NEW GREEN BAG.

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Schematic diagram of Sturtevant Micronizer. Top disc shows jet axes (left) and feed inlet (right). Below, Micronizer feed funnel is shown (top right). Other parts of interest are fluid outlet (top center), grinding chamber (at base of feed funnel) and product collection area (bottom, beneath centerline.) top right—Putting feed into 8" Micronizer (which has two bag collectors) at Sturtevant's fine grinding pilot plant, opened last April.

STURTEVANT Mill Company, Boston, announces the successful fine grinding of particles to a half-micron (1/100th the diameter of average human hair) in modified Sturtevant "Micronizers," fluid energy mills with no moving parts.

Making this theoretical reduction a reality marks the second major step in a few months in Sturtevant's accelerated attempt to perfect methods of fine grinding. The first was the start-up of a fluid energy grinding pilot plant in April 1957 for experimentation and custom grinding.

The announcement was made by Sturtevant's new board chairman, William T. Doyle, who called the achievement "extremely important. Behavior efficiency in dispersions and blends can be made considerably more effective through micron-size particles." Doyle, who pioneered the fine grinding plant while he was president



New Advances In SUPERFINE GRINDING

of the company said, "The variety of materials that can be reduced to sub-microscopic sizes is growing every day. New materials constantly are being tested and work is in progress to adapt the "Micronizer" to handle extremely hard and abrasive materials." He would not speculate on how long it

would take to achieve this goal, but hinted that experiments are providing the company with useful information.

The "Micronizers" in which the testing took place operate on the principle of super-speed rotation of particles produced by jets of compressed

(Continued on Page 125)

Typical Grinding Data For Various Materials
Processed In The Sturtevant Micronizer

Material	Mill Diameter	Grinding Type	Medium Flow	Solid Feed Rate	Approx. Avg. Particle Size
Titanium Dioxide	30"	Steam	4000 lbs./hr.	2250 lbs./hr.	3/2u
Sulphur	24"	Air	1000 lbs./hr.	1300 lbs./hr.	3-4u
Talc (Varies)	30"	Steam	4000 lbs./hr.	2000 lbs./hr.	2u
Iron Oxide Pigment	30"	Steam	4000 lbs./hr.	1000 lbs./hr.	2-3u
Cryolite	30"	Steam	4000 lbs./hr.	1000 lbs./hr.	3u
Barytes	30"	Steam	4000 lbs./hr.	1800 lbs./hr.	3-4u
Fuller's Earth	20"	Steam	1200 lbs./hr.	600 lbs./hr.	3-4u
Anthracite Coal	20"	Air	1000 c.f.m.	1000 lbs./hr.	5-6u
DDT (50%)	24"	Air	1000 c.f.m.	1100 lbs./hr.	5-6u
Procaine-Penicillin	8"	Air	100 c.f.m.	20 lbs./hr.	5u 20u top

Air — 100 lbs. pressure — 60° F.
Steam — 150 lbs. pressure — 550° F. total temp.

Weed Inspectors Short Course

The 17th annual Weed and Seed Inspectors Short Course was held Jan. 20-24 on the St. Paul campus of the University of Minnesota, featuring a variety of topics on weed control methods, seed and weed inspection regulations and recent research. Program chairman for the evening was R. S. Dunham, University agronomist.

Topics discussed include township, county and state coordination in

regulation, weed control in corn and soybeans, aerial spraying, lawn weeds, weed seed problems in feeds and other weed control problems; herbicide formulations; the state seed inspection program.

The program featured speakers from the University, the Minnesota Department of Agriculture, the Department of Conservation, the Minnesota County Weed and Seed Inspectors' association, several commercial concerns and the U. S. D. A.

USI Expands Facilities

New sulfuric acid decomposition and purification facilities have been put in operation at the Sunflower, Kansas plant of U. S. Industrial Chemicals Co. U. S. I is a division of National Distillers and Chemical Corporation. The addition of the decomposition and purification unit to the Sunflower sulfuric acid plant will provide U. S. I.'s midwest customers with the means of profitably disposing of spent acid. The new facilities, designed by Chemical Construction Corporation, bring the total capacity of the Sunflower plant to 250 tons per day on a 100% sulfuric acid basis.

It's Sesone!

In our December 1957 report of the Dusting and Spraying Conference in Washington, (page 83) we incorrectly identified 2,4-DS as "Sesoxane" . . . it should of course be "Sesone." Sesone, a herbicide has properties entirely different from those of Sesoxane, which is a synergist for pyrethrins, allethrin and methoxychlor. Sesoxane, is made by Shulton, Inc., Clifton, N. J.

Sesone, the herbicide described in our report is made by Carbide and Carbon Chemicals Co., New York.

Guthion for Deciduous Fruits

Chemagro Corp., New York, N. Y., has announced the registration of "Guthion" 12½% wettable powder by the U. S. D. A. for use on deciduous fruits.

Registration of Guthion is of special interest to apple growers, for it introduces a significant new concept in the control of apple insect pests. Chemagro reports that because it effectively controls practically all insects which attack apples, the use of Guthion virtually eliminates the necessity of employing three or four different chemicals.

Fabricated Metals, Div. Mgr.

Peter Stern has been appointed manager of the industrial sales division of Fabricated Metals, Inc., San Leandro, Calif. The division concentrates on handling bulk materials thru use of equipment that has been successfully applied in the agchem field.



TOP: This 8'-0" x 60'-0" rotary dryer removes excess moisture and completes the granulation. Dryer is oil heated.

RIGHT: The lifters, with their unique cup-like design and their staggered arrangement in the unit, cause the granules to be evenly distributed.



A McDERMOTT 8 x 60 DRYER INSTALLATION AT THE SAGINAW PLANT OF THE AMERICAN AGRICULTURAL CHEMICAL CO.

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The Answer: **ESPESOL 1**

Under conditions where high flash is desirable, you will find Espesol 1 an ideal diluent. High aromatic content assures high solvency power and because Espesol 1 is a direct unit-produced solvent rather than a blended product, formulators know they can depend on consistent uniformity, run after run.

Tested and approved by government and college experiment and extension facilities, Espesol 1 is non-phytotoxic and offers a fast evaporation rate because of its narrow boiling range. For a proven, high-flash diluent, specify Espesol 1!

Available on short notice delivery from all of Eastern States' terminal facilities, Espesol 1 can be ordered in drum, transport, tank car, barge and ship tank lots.

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Because 5. Our new modern plant makes a full line of top-quality nitrogen products.

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Want more information? Call any Standard Oil office. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Ill.



STANDARD OIL COMPANY

Indiana

"Crag" Transfers to Texas

Union Carbide Chemicals Co., Division of Union Carbide Corp. is transferring H. L. Vincent, Crag agricultural chemicals sales representative, from the eastern gulf coast states to southern Texas. He will headquarter at his residence, 135 Carlton Road, Brownsville, Texas. Mr. Vincent's new sales territory—an important cotton-growing area where pink bollworm is a notorious pest—extends from the Rio Grande Valley north into the Brazos River Bottom. He will concentrate on developing the market for Carbide's new Sevin experimental insecticide, which has given excellent control of pink bollworm and many other cotton insects in extensive field tests.

Mr. Vincent will divide his time between sales and development, the company said. In addition to calling on formulators, he will conduct field tests in cooperation with the Department of Entomology, Texas A&M, College Station, and with cotton experts at the U. S. Department of Agriculture experiment station at Brownsville. Prior to his transfer, Mr. Vincent supervised wide development work with Sevin throughout the Mississippi Delta.

Geigy Announces 4 Districts

Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation, Ardsley, New York, announces the formation of four sales districts to facilitate nationwide distribution of its products.

Coordination and supervision of overall district sales operations have been assigned to L. G. Gemmell, assistant to the division president, G. R. Ferguson.

J. J. Hood has been appointed assistant sales manager in charge of technical services.

The eastern sales district, covering the territory from Maine to Florida, has been assigned to S. C. LeVasseur with offices at Ardsley, New York.

L. C. Ohle, with offices at Kansas City, Missouri, has been named district sales manager for the south cen-

tral district, which includes Colorado, Nebraska, Missouri, Tennessee and states lying south of these.

The north central district, comprising the northern section of the midwest farm states, will be in charge of Haskell Tison at Geneva, Ill.

C. L. Turzan of Fresno, Calif., has been named district sales manager for all states west of the Rockies.

The above managerial personnel combine many years of experience and they are well qualified to handle the coordination and servicing of Geigy's rapidly expanding business in the agricultural chemical field.

FIELD FERTILIZATION OF PINE —

Heavy tractor equipment clears 100 acre tract of Escambia Chemical Corporation near Milton, Florida. Controlled experiments in tree fertilization may lead to guides in yield increase, and cost reduction.

Industry - government officials plan fertilization studies. Company acreage, near Milton, Florida, was selected as typical of Southeastern states growing areas. Shown examining the plan map are, seated: R. C. Rayburn and Ralph Brown, Escambia Chemical Corporation; and Dr. Frank Woods, U.S.D.A. Standing: Dr. R. H. Brendemuehl, U.S.D.A., and J. S. Williams, United Gas Company.

Standard Forest Service Nursery pine seedlings will be used to plant the 100 acres of Escambia Chemical Corporation, near Milton, Florida. Different types and quantities of fertilizer will be used in this long range cooperative effort by the U.S.D.A. and industry. Shown discussing the project in the field are, (Left to right): R. C. Rayburn, Escambia Chemical, Dr. R. H. Brendemuehl, U.S.D.A., Dr. Frank Woods, U.S.D.A., Fred Hendricks, Escambia Chemical, and J. S. Williams, United Gas Company.

Fulton Concentrates in Atlanta

Fulton Bag & Cotton Mills will now concentrate its textile bag and related cotton specialty manufacturing in Atlanta, which will require the services of additional employees in the immediate future, Mr. Clarence E. Elsas, president of the company announced.

Fulton's Atlanta bag plant produces cotton and burlap bags, waterproof paper lined carpet wraps and WPPL bags, canvas products, furniture pads and related items. The company has been distributing these products nationally for ninety years.





32 plants... for prompt delivery of AA quality products

32 plants of the A.A.C. Co., located in the United States, Cuba and Canada, with main office in New York, assure you dependable, fast deliveries of AA quality products for farm and industry. You can schedule your production with confidence... the right quantity and grade will be at your plant when you need it.

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The
**American
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producers of:

Florida Pebble Phosphate Rock • Superphosphate
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers • Gelatin
Bone Products • Fluosilicates • Ammonium Carbonate
Sulphuric Acid • Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus



GENERAL OFFICE: 50 Church Street, New York 7, N. Y.

Kansas Pest Conf. Feb. 4-5

The second annual Kansas insect and weed control conference was to be held at Kansas State College, Manhattan, on February 4 and 5. C. C. Burkhardt, conference chairman, said latest research would be discussed briefly, insect situations reviewed, and insect and weed control recommendations given. Talks to encourage most efficient use of pesticides were also on the program.

Although the program is directed primarily to dealers of pesticides and custom ground and aerial applicators, Burkhardt said anyone interested in these subjects, such as county weed supervisors and county agents, would be welcome.

New Fulton Corp.

Fulton Bag & Cotton Mills, Atlanta, sold its branch bag manufacturing plants at New Orleans and St. Louis last month. Purchaser is the Fulton Bag & Products Co., a newly formed corporation with headquarters in New Orleans. Officers of the new company are: Jason M. Elsas, president; Peter H. Walmsley, vice-president and treasurer; J. Frank Greeley, vice-president; H. H. Rogers, secretary. All have been active at New Orleans and St. Louis for many years. Other officers include Charles Powers, vice-president; Lee V. Williams, Jr., assistant secretary. Charles Sammons, Thomas A. Rose, Jr., and Mr. Elsas will serve as directors.

The new firm plans to continue to manufacture the items produced at New Orleans and St. Louis. Sales offices are maintained in New York, Chicago, Minneapolis, Denver, Dallas, Atlanta, and Kansas City.

New Hercules Sales District

The Greenville, Miss., office of the Hercules Powder Co.'s Naval Stores Department has been established as headquarters for a new sales district.

Leonard V. Edwards has been named district sales manager of the office which will serve Arkansas, Louisiana, and Mississippi. Mr. Edwards, who joined Hercules in 1952, was in charge of the toxaphene demonstration program in Louisiana

last year. The new Greenville office will handle the sales of all Naval Stores Department products, including turpentine, Toxaphene, meta Delphene, and Delnav.

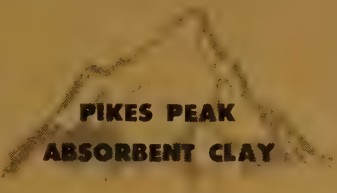
Kolker Production Report

Kolker Chemical Corp., New Jersey, announces the start of production of dimethyl phthalate and diethyl phthalate at its plant in Newark, N.J. The plant has an annual production capacity of 50,000,000 pounds of various plasticizers, which include phthalates, phosphates, and epoxy types.

Dalton Joins AAC Company

Dr. Joseph D. Dalton last month joined the research department of the American Agricultural Chemical Co., New York. He will participate in the firm's continuing fertilizer research program.

Dr. Dalton is a native of Tennessee. He obtained his bachelor's degree from the University of Tennessee, his master's degree from Kansas State University, and his doctorate in soil chemistry from the University of Massachusetts.



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Pikes Peak clay's exceptionally low moisture content and pH of 5 is your assurance of highest compatibility with malathion, methyl parathion, ethyl parathion or other phosphated insecticides.

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In Ag Sales Post With CSC

Loy A. Everett of Albany, Ga. has been named assistant sales manager of Commercial Solvents Corporation's agricultural chemicals sales department. He will make his headquarters at the New York Office.



Mr. Everett's responsibilities include the development of marketing programs for the company's expanded production of nitrogen fertilizers and the activation of these programs on a regional basis. His activities will be directed toward the sale of CSC's nitrogen products including Dixsol Nitrogen Solutions and Hi-D ammonium nitrate to fertilizer manufacturers.

Ontario Soil and Crop Conv.

Several talks on fertilizer featured the annual convention of the Ontario Soil and Crop Improvement Association held January 29-31 at the Coliseum in Toronto, Ontario, Canada.

"New Fertilizers for Modern Farming" were to be discussed by Kenneth Pretty of Michigan State University while Professor N. R. Richards, Head of the Soils Department of Ontario Agricultural College, was scheduled to speak on "The Ratio System of Fertilizer Recommendations." Dr. W. L. Nelson of Lafayette, Indiana was to discuss "Fertilizer Placement Is Important."

Price Drop on $CuSO_4$

The carlot price for copper sulphate in crystal form has just been reduced to \$10.70 per cwt, a reduction of 85¢ per cwt from the previous level. The move follows a decline in the price of metal and brings the cost of copper sulphate down currently to about the figure at which it sold in 1954.

This is the second recent reduction in copper sulphate prices, the last having occurred in September '57. Less than carlot prices for copper sulphate now range from \$11.20 to \$13.70 per cwt.

The new carlot price for tri-basic copper sulfate is \$24.40, a reduction of \$1.05 per cwt. The less carlot range on tri-basic is from \$25.40 to \$28.40 per cwt.

AGRICULTURAL CHEMICALS

Robertson Joins Spencer

Dr. Nat C. Robertson has been appointed general manager of research and development for the Spencer Chemical Co. Kansas City, Mo. Dr. Robertson will assume his new responsibilities Feb. 15.

In his new position, Dr. Robertson will be responsible for managing Spencer's research and development activities including the operation of the new Research Center recently constructed in suburban Kansas City.

Before joining Spencer, Dr. Robertson was a director and Vice President of Research for Escambia Chemical Corporation. He has been associated with Escambia and its affiliate, National Research Corporation, since 1951.

Soil Builders Contest Opens

Farm magazine editors have been invited to submit entries for the Sixth Annual National Plant Food Institute "Soil Builders Award for Editors" contest, the deadline for which is March 15, 1958.

The contest is designed to honor editors and their staffs for their 1957 editorial contributions in the important field of building and maintaining soil fertility.

For the purpose of the contest, farm magazines are divided into two categories—those with more than 300,000 circulation and those with less than 300,000.

Appointed Branch Manager

Walter R. Brandt has been appointed Branch Manager of the West Coast Sales office of the General Dyestuff Co., and in addition will act in the capacity of Western Regional Manager for Antara Chemicals. General Dyestuff Co. and Antara Chemicals are sales divisions of the General Aniline & Film Corp., New York.

In his new position Mr. Brandt will be in charge of sales of dyestuffs, pigments and chemicals for the entire West Coast. He will make his headquarters at the company's San Francisco, Calif., branch office.

For the past six years Mr. Brandt has been manager of textile, paper

and leather chemicals in the company's main sales offices in New York City.

Mantrose Elects Weed

William J. Weed, formerly vice president Niagara Alkali Co., has been elected chairman of the executive committee and member of the board of directors of the Mantrose Corp., a shellac bleaching firm. Mr. Weed had been associated with Niagara Alkali Co. since 1913 and with Hooker Electrochemical Co. for the last two years, following the merger of Niagara Alkali with Hooker. His retirement from Hooker became effective December 31st, 1957.

Three New Du Pont Units

Three new production units for the manufacture of hydrogen and anhydrous ammonia, aniline, and diphenylamine will be built by E. I. duPont de Nemours & Co., Wilmington, Del., at the Repauno Works, Gibbstown, N.J.

The unit for hydrogen and anhydrous ammonia will be the first one at the Repauno Works. Construction will begin immediately and the units, which will be operated by the company's explosives department, are expected to be completed within two years.

New Molony Unit in S.C.

A newly constructed \$30,000 bagging and shipping unit at the Molony Fertilizer Co. plant, in Charleston, S. C., is expected to be in use this month.

Package Exposition Mar. 25-28

The 1958 Packaging Machinery and Materials Exposition to be held in Atlantic City, N. J., March 25 to 28, is expected to extend over a 25 per cent larger exhibit area than the previous exposition held 18 months ago.

The Packaging Machinery Manufacturers Institute, Inc., sponsors of the exposition, have announced that over 93 per cent of available exhibit space has been sold to 142 manufacturers of packaging machinery and materials. Attendance also is expected to be higher than at the 1956 exhibit in Cleveland.

A series of technical sessions sponsored and conducted by Packaging Institute, New York, will be held concurrently with the exposition.

Among the exhibitors will be; the Union Bag-Camp Paper Corp., New York; the Continental Can Co., New York; the Link-Belt Co., Chicago; E. I. DuPont de Nemours & Co., Wilmington, Del.; and the Exact Weight Scale Co., Columbus, Ohio.

Newly-appointed National Plant Food Institute regional personnel met last month in Washington, D.C., to study and become more familiar with NPFI operations, and to confer with staff members on the expanded research and the education program of the Institute. Shown with Dr. Russell Coleman and Paul T. Truitt (seated left to right) Institute executive vice presidents, in the accompanying photo (standing left to right) are: Zenas H. Beers, who will be Midwest regional director; Dr. W. H. Garman, chief agronomist and Northeast regional director; Dr. Samuel L. Tisdale, South east regional director; F. Todd Tremblay, Pacific Northwest representative; Dr. Richard Bahme, California and Arizona representative; and Dr. Robert L. Beach, Southwest regional director.



KEY YOUR LINE AROUND THESE POWERHOUSE MONSANTO TWINS . . .

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YOUR CUSTOMERS' PROBLEM . . . Your customers are looking for ways to cut costs and maintain profits in the face of rising freight rates, increased cost of equipment and supplies.

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THE PROVEN ANSWER . . . While their insect problems may vary, all growers want fast, effective—and, most of all, *economical*—control.

FOR BOLL WEEVIL . . . Methyl Parathion offers proved control of boll weevil, *including resistant species*. It also controls cotton aphid and

spider mites, cotton leaf perforator, cotton leaf worm. Formulates into dusts, wettable powders and emulsifiable concentrates.

FOR CITRUS PESTS . . . Only Parathion offers *sure*, broad-range control of citrus pests at *lowest cost* per acre: citricola scale, cottony-cushion scale, purple scale, California red scale, yellow scale, aphids, little fire ants, mealy bugs, orange tortrix, plant bugs, and thrips.

FOR SPOTTED ALFALFA APHID . . . Community-wide spray programs, based on the use of either Parathion or Methyl Parathion, are proving the sound, low-cost answer to the problem of effective alfalfa aphid control.

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**fast insect control
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and consolidate their
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About 25c per hundred square feet is all it costs to clear an area of all the weeds shown here with OLDBURY® sodium chlorate.

Sodium chlorate provides sterilization until it has been leached from the soil. The same treatment kills off all other weeds and grasses.

Fast delivery from two plants • You get fast, dependable delivery of OLDBURY sodium chlorate from the Hooker plants at Niagara Falls, N. Y. and Columbus, Miss.

Technical help available • Full-time Hooker agronomists are always ready to serve you. They are equipped to

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99% pure • You can get 99% pure OLDBURY sodium chlorate in steel drums, 100 and 450 lbs. net. For price and shipping information, write today.

For controlling weeds on railroad right-of-way, you can get the skilled services of specialists who apply formulations made with OLDBURY sodium chlorate.

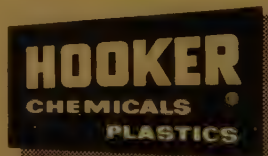
For defoliating cotton, particularly in irrigated areas, OLDBURY chlorate is used in special formulations.

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Mid West Agronomy Meeting Scheduled for Feb. 13-14

SUMMARY results of the study on "Farmers' Attitudes Toward the Use of Fertilizer" will get top billing at the annual conference of Midwestern Agronomists and Fertilizer Industry Representatives in Chicago, February 13-14.

Zenas H. Beers, National Plant Food Institute's midwest regional director, and Dr. M. S. Williams, chief agricultural economist for the Institute, who will make the presentation, will concentrate on results as they relate to the Midwest. National Analysts, Inc., of Philadelphia, conducted the recently-completed study for the Institute.

Some 700 people are expected to attend the conference. This popular meeting formerly was sponsored by the Middle West Soil Improvement Committee.

The National Plant Food Institute, through its Midwest Regional office, is sponsoring the meeting this year and intends to do likewise in the future. Dr. A. J. Ohlrogge, Purdue University, is chairman of the conference.

Other leading subjects for the session include: 1957 experience with improved implements for proper fertilizer placement; insect control; fertilizer research reports; and effectiveness of dealers' selling methods.

Drs. J. M. Bohlen and G. M. Beal, Iowa State College, will compare the differences in the effectiveness of selling fertilizer as shown by two groups of dealers. Their presentation will show dealers' attitudes toward farmers and farmers' attitudes toward dealers, and will complement the presentation by Beers and Williams.

Prior to the conference, agricultural extension agronomists will meet Wednesday with G. P. Walger, Purdue University, presiding. On Tuesday, the North Central Soil Research Committee will meet with R. V. Olson, Kansas State College, presiding.

Room reservation cards have been mailed from Chicago to NPFI's

member representatives. Personnel who do not receive cards can make reservations directly with the Edgewater Beach Hotel, indicating they will be attending the conference.

New NH_3 Units for du Pont

Three new production units for the manufacture of hydrogen and anhydrous ammonia, aniline, and

diphenylamine will be built by the Du Pont Company at the Repauno Works, Gibbstown, N. J. The unit for hydrogen and anhydrous ammonia will be the first one at the Repauno Works.

Construction will begin immediately and the units, which will be operated by the company's Explosives Department, are expected to be completed within two years. Operation of the new facilities is not expected to require any increase in employment.



New Modern Plant Where SER-X is Produced

SER-X is a potassium hydrous alumina silicate of the following analysis: SiO_2 73.08%, Al_2O_3 13.70%, Fe_2O_3 3.12%, TiO_2 0.54%, CaO 0.30%, MgO 1.14%, N_2O 0.22%, K_2O 5.42%, Ign. Loss 2.54%, Fusion Point Cone 12.

Processed from Sericite ore, **SER-X** has an average particle size of 3.5 microns and a bulk density of 40 pounds per cubic foot. **SER-X** is inert, non-hygroscopic and non-shrinking. The particles are flat. Because of these physical and chemical properties it has proved ideal as a diluent in the formulation of agricultural insecticide dusts.

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Formulators Report
Excellent Results

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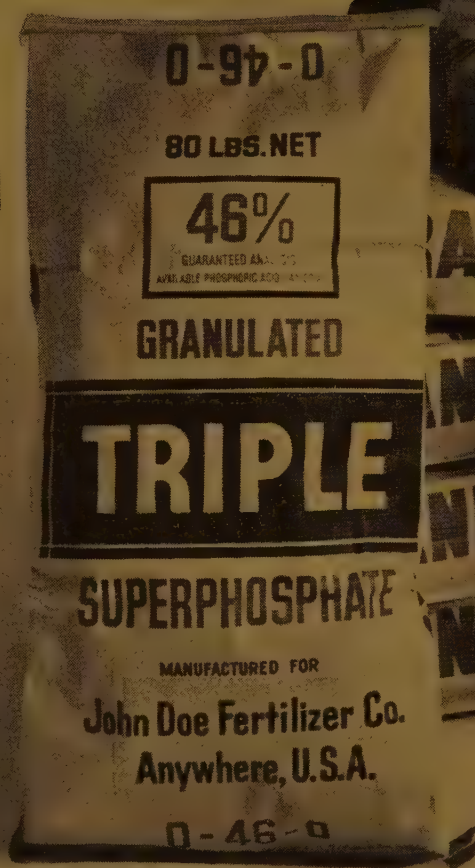
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**It pays to order
this brand
this month**

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Come March, April and May, orders for Davison Granulated Triple Superphosphate reach their peak. By ordering your supply of Davison GTS this month, you'll be sure to get as much as you need of the triple superphosphate *all other granulated products are compared to*. Remember: Davison GTS guarantees you a 46% A. P. A. minimum. It is unsurpassed for direct application. It's dust free, it spreads evenly, flows freely, won't cake. And it's ideal for formulation of dry materials, particularly alkaline goods such as 0-25-25 and 0-20-20. Won't break down in handling, packaging or storage. Available in bulk or bags. Get the brand guaranteed to satisfy you on every count. Order your supply of Davison Granulated Triple Superphosphate *this month*.

DAVISON
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Baltimore 3, Maryland



Eastman Reorganizes Sales

Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co., New York, has announced a reorganization of the field sales activity of its chemical division into three regional areas.

Robert H. Cannon will direct sale of chemicals and dyes in the New England and middle Atlantic states, including operation of the company's distribution center at Lodi, N. J.

John H. Sanders becomes regional sales manager for those areas served by the division's Cleveland, Cincinnati, and Greensboro, N. C. offices plus other areas of the south and southeast.

Decatur B. Campbell Jr. has been appointed regional sales manager of the mid-western area and will direct sales in areas served by the company's Chicago, St. Louis, and Houston offices.

Eastman supplies manganese sulfate, feed-grade antioxidants, and chemical intermediates used in the manufacture of insecticides and feed ingredients.

Wiley Award Nominations

The Association of Official Agricultural Chemists, Washington, D. C., is inviting nominations for the second Harvey W. Wiley award for the development of analytical methods.

Nominations must be made to the secretary of the association before April, 1958 and the award of \$500 will be made at the association's 72nd annual meeting in October, 1958.

The award is given to the scientist or group of scientists who have made outstanding contributions to the development and establishment of methods of soils, fertilizers, pesticides, plants, feeds, foods, colors, cosmetics, or drugs, as well as for methods in general analytical chemistry.

Carbide Reassigns Reps.

Three technical representatives were recently transferred by Union Carbide Chemicals Company, Division of Union Carbide Corporation. The transfers are: Clair S. Mitch to

the Chicago district, Robert G. Short to the Charlotte district, and Carl N. Spagnuolo to the Philadelphia District.

Henry W. Stoke Dies

Henry W. Stoke, head of the Farmers Cooperative Exchange farm chemical department, Washington, D. C., died of a heart attack on Jan. 22 while attending the annual pesticide school at N. C. State College, Raleigh.

Drewry, IMC Southern Mgr.

Judson H. Drewry has been named southern area sales manager for the phosphate minerals division of International Minerals & Chemical Corp. with headquarters in Atlanta, Georgia. Since 1949, Mr. Drewry has been sales representative for IMC's potash division in Shreveport, Louisiana. In his new post he will direct sales of phosphate rock in the southern area from offices at 1325 Fulton National Bank Building in Atlanta.



**Vanderbilt
puts dusts
and sprays
in physical condition to kill**

For full killing power, your dusts and sprays need the right physical properties — to absorb and disperse the toxicant thoroughly — to make them cling, cover, and stick in doing their deadly work. Vanderbilt carriers, diluents, and dispersing agents are *specially developed* to give dusts and sprays these important physical properties that mean more efficient coverage and increased lethal effectiveness in the field.

PYRAX ABB

The most widely used pyrophyllite in agriculture. Adheres electrostatically to dry foliage. Ideal for aircraft dusting.

DARVAN #1 & #2

Outstanding dispersing agents. Produce increased toxicant effectiveness through better dispersion of wettable concentrates.

CONTINENTAL CLAY

Superior nonalkaline carrier for high-bulk dusts and wettable concentrates, remarkable for dispersability, absorption, and flowability.

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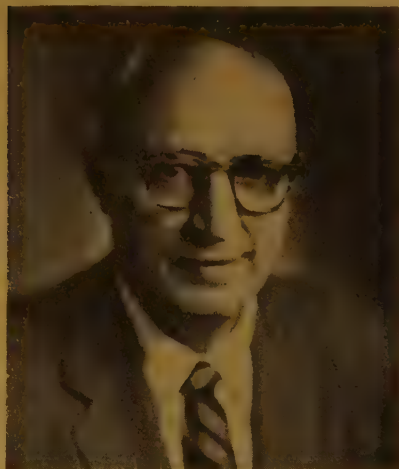
NAME _____

POSITION _____

(Please attach to, or write on, your company letterhead)

Jones Nitro. Div. Tech. Dir.

R. M. Jones has been appointed director of technical service for the Nitrogen Division, Allied Chemical & Dye Corp., New York, succeeding



R. M. Jones

E. W. Harvey who retired January 1. (See Pg. 89) In addition to his new duties Mr Jones will continue as manager of product development for the division.

He has been with Allied since 1927, and worked on the technical and marketing aspects of nitrogen solutions during the early thirties. From 1940 to 1946 he was assistant sales manager for industrial chemicals, and has been manager of product development since 1946.

North Central ESA Meeting

The 13th annual conference of the North Central Branch of the Entomological Society of America will be held at the Sheraton-Jefferson Hotel, St. Louis, Mo., March 26 to 28, 1958.

Included on the program is an address by the president of the ESA, Dr. Robert L. Metcalf of the U. of California.

Other sessions will include talks on such topics as: World Program for Elimination of Malaria by Dr. Fred L. Soper, director, Pan American Sanitary Bureau, World Health Organization; Genetics as a Tool in Entomology by Dr. Walter Rothenbuhler, Iowa State College; and The Cricket on a Diet by Dr. Philip C. Stone, U. of Missouri.

R. W. Dean, New York Agricultural Experiment Station, Geneva,

will present a report of 18 months in the Philippines and Dr. Randall Latta, head of the Stored-Product Insects Section, USDA, will report on the International Congress of Crop Protection, Hamburg, Germany.

Sixteen discussion sections will cover forest and shade tree insects; cereal, forage, and truck crop insects; fruit insects; systemics — classification of insects; insect testing and rearing; medical and veterinary entomology; survey methods; and insecticides.

NAC Fall Meeting Oct. 29-31

The annual meeting of the National Agricultural Chemicals Association will be held in October this year, rather than in September, immediately following Labor Day, as it has been for many years past. The dates for the 58 session are October 29-31, and the meeting place is the General Oglethorpe Hotel in Augusta, Ga.

Pest Service Division

Planters Chemical Corp., Norfolk, Va., recently announced a newly organized pest service division, featuring termite control and general pest control service. The new division is under the management of A. J. Kirby.

Named Asst. Ext. Specialist

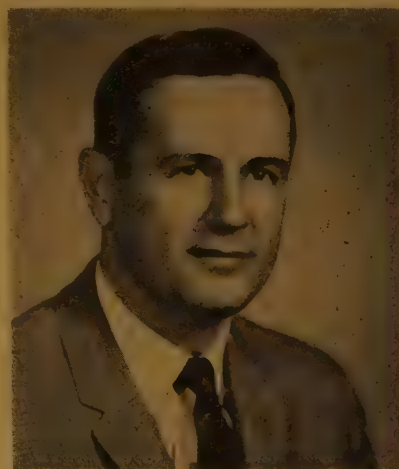
Dr. William E. Collins has been named assistant extension specialist in entomology at the College of Agriculture, Rutgers Univ., New Brunswick, N. J. He succeeds Dr. Robert E. Treece who is returning to Ohio to do research in entomology.

Projected New Fertilizer Plants

The Manufacturing Chemists Association, Washington, D. C., has just released a series of reports outlining estimated sums that will be spent in 1958 and 1959 for the construction of new chemical-producing facilities in various parts of the country. Following are some of the significant totals for construction of new fertilizer plants: California, \$20,400,000; Florida, \$16,475,000; Illinois, \$12,000,000; New Mexico, \$17,250,000; Mississippi, \$9,000,000; Ohio, \$500,000; Texas, \$27,300,000; and Louisiana, \$12,000,000.

Wessel Joins Va.-Carolina

Henry E. Wessel, former manager of marketing research for the research and engineering division of Monsanto Chemical Co., St. Louis,



Henry E. Wessel

has just joined the fertilizer division of Virginia-Carolina Chemical Corp. as assistant to the general manager. He will direct staff services of marketing research, sales planning, budgets, cost and production control and product development for V-C's fertilizer operations.

Mr. Wessel joined Monsanto in 1941 following graduation from the Illinois Institute of Technology. He left Monsanto in 1952 to become manager of engineering economics for the Midwest Research Institute, Kansas City, and then in 1955 joined International Minerals & Chemical Corp., Chicago, in charge of product development, returning to Monsanto in 1956.

Cranberry Growers Meet

The Annual meeting of the American Cranberry Growers Association was to be held February 6th in Fenwick Hall, Pemberton, N. J. Scheduled for discussion at the meeting were a series of problems involving control of insects, diseases and weeds in cranberry culture.

Joins Union Bag Sales

The Union Bag-Camp Paper Corp., New York, has appointed Blaine Loudin as multiwall bag sales representative covering eastern Pennsylvania and southern New Jersey.

Phytopathological Society Celebrates Golden Jubilee in 1958

THE annual meeting of the American Phytopathological Society—always a big event—is expected to break all records in this Golden Jubilee Year of 1958.

Planned especially to commemorate the 50th Anniversary of the founding of APS, the meeting will feature as symposia speakers many of the world's leading authorities on plant diseases and their control. It is scheduled for August 24-28 in Bloomington, Ind. and will be in conjunction with the annual national meeting of the American Institute of Biological Sciences.

Although this date is still several months away, the program is practically complete, and includes nearly a score of outstanding foreign plant pathologists. For example, scheduled to participate in a symposium on "Fungicides—Basic Considerations" are Dr. D. Woodcock of the University of Bristol, England; Dr. G. J. M. van der Kerk of the Organisch Chemisch Institute, The Netherlands, and Dr. Hubert Martin of Canada's Science Service. Dr. H. P. Burchfield of the Boyce Thompson Institute is also a member of this symposium.

Pointing up the anniversary aspects of this annual meeting will be six major addresses by some of the Society's most distinguished members covering various phases of the history and the development of the science of plant pathology. An address by Dr. E. C. Stakman of the University of Minnesota, "The Role of Plant Pathology in the Scientific and Social Development of the World," will keynote the joint sessions of APS and AIBS.

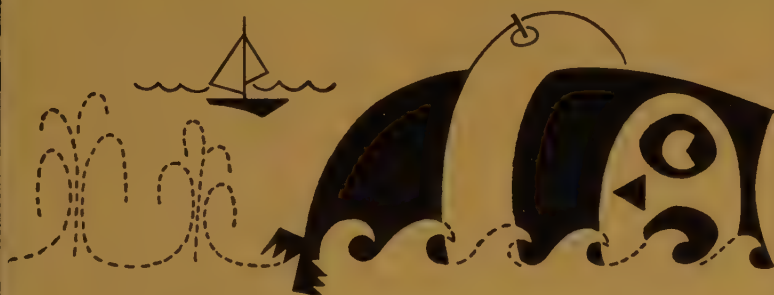
All of the major addresses before the annual meeting will be published in a Golden Jubilee volume.

Concerned with the fact that increased emphasis on sciences nationally heightens the competition for young people entering into science careers, the 50th Anniversary Committee is planning several other events during the year to bring plant pathology more into public consciousness.

A 16 mm sound-color motion picture is being produced to show the various types of careers that can be made in plant pathology. Copies of the picture, to be completed later this year, will be available to schools and universities. A career brochure, aimed at interesting high school and college students in training in plant pathology, is also in preparation.

The 50th Anniversary Committee of APS, which is directing these varied activities, is made up of Wayne Beaver, University of Illinois; D. E. Ellis, North Carolina State College; J. C. Harrar, The Rockefeller Foundation; W. B. Hewitt, University of California; C. S. Holton, State College of Washington; H. A. Rodenhiser, U. S. Department of Agriculture; J. R. Shay, Purdue; R. H. Wellman, Carbide and Carbon, and G. S. Pound, Univ. of Wisconsin, chairman.

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Brady



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Shell Chemical Management Changes

The Chemical Sales Division of the Shell Chemical Corp., New York, has made three management changes in its New York and St. Louis offices.

John R. Brady Jr. has been named district manager at St. Louis. He had been senior technical salesman of the company's Torrance, Calif., synthetic rubber sales division. Thomas F. Mika, formerly assistant to sales development manager, is now assistant to the sales manager, New York; and William A. McCormick, formerly district manager, St. Louis, was named assistant to sales development manager, New York.

National Aniline President

Chester M. Brown has been named president of the National Aniline Division of Allied Chemical & Dye Corp., New York. He succeeds the late Albert E. Cleghorn, who died suddenly last month.

In addition to his National Aniline post, Mr. Brown will continue as an Allied vice president.

To West Coast for Chipman

Blanchard Smith, vice-president of Chipman Chemical Co., Bound Brook, N. J., has been transferred to the Chipman west coast office at Portland, Ore., where he will take charge of all west coast operations for the company. He had formerly been responsible for directing sales, advertising and transportation at Chipman's eastern division.

In the new set-up Irv Bales, vice-president in charge of research at Bound Brook, will take on the added responsibility of supervising all of Chipman's district offices east of the Rockies.

Six Accident-Free Plants

The six fertilizer plants of Canadian Industries Ltd, Montreal, located in eastern Canada set a perfect safety record in 1957. The plants are located at Halifax; Montreal; Beloeil, Que.; Hamilton, Ont.; Chat-ham, Ont.; and Norwich, Ont.

The plants have amassed a total of almost 4 million accident-free hours. Regular employee strength in all plants is about 225.

75 Years for Acme Fertilizer

Acme Fertilizer Co., Wilmington, N. C., is currently celebrating its 75th year. Founded in 1883, ownership has remained in the hands of the same family through the years. Thomas H. Wright, Jr., president, is a grandson of William Gilchrist, founder. Thomas H. Wright, Sr. was president of Acme for nearly 25 years.

The original factory site was at Acme, N. C., and still remains there.

Ten years ago Acme added insecticides and other agricultural chemicals to its line.

Outlook for Bag Sales

"The entire bag-making industry has been in the midst of change the last few years," observes Homer V. Howes, vice-president and director of sales for Bemis Bro. Bag Co., St. Louis, in a statement appearing in the annual year-end issue of the *St. Louis Globe-Democrat*. He notes that the market for textile bags has suffered a continuing decline, under the influence of shippers turning to less expensive paper bags. With the market for textile bags narrowing, an excess of supply over demand tended to keep prices depressed during 1957.

This situation may be expected to continue to a certain extent during 1958, he believes, although there has been a reduction in productive capacity as some textile bag operations closed during '57. "At the same time," he comments, "competition in paper bags last year became more keen as demand barely held steady."

To Head Agricultural Sales

National Lime & Stone Co., Findlay, Ohio has appointed Robert H. Dow to be in charge of agricultural sales, according to an announcement by Clarence Heidtman, general sales manager. Mr. Dow has been employed by National for the past 25 years.

El Dorado Plant Producing

The El Dorado, Ark., plant of the Michigan Chemical Corp., Saint Louis, Mich., has begun production of ethylene dibromide for agricultural and industrial use.

The material is offered in standard 900 pound steel drums as well as tank cars.

Atoms vs. The Screwworm

The U.S. Department of Agriculture has prepared a four-page picture story on the use of radiation to eradicate the screwworm from Florida and the Southeast where this livestock pest causes losses of over \$20 million a year.

The pictures in the booklet show the life cycle of the screwworm and the operations of mass rearing, sterilizing with radiant energy from cobalt-60, and distribution by aircraft of sterile flies during the pilot field test near Orlando, Fla.

Dorsett Joins Witco

Richard H. Dorsett has joined the sales staff of the Witco Chemical Co., New York. He will handle products of the Emulsol Division as well as Organic Chemicals and Rubber Chemicals Division materials.

Mr. Dorsett, who is attached to Witco's Houston, Texas, sales office, formerly was with the sales department of the Plant Food Division of Olin Mathieson Chemical Co.

S. Dakota Pest Control Conf.

The 11th annual South Dakota Weed and Pest Control Conference will be held in the City Auditorium at Miller, S. D., March 18 and 19. Topics to be discussed include: pesticide residue problems, the toxic effect of herbicides on livestock, new pesticides, etc.

Equipment, Supplies, Bulletins



New Package Design

Is it possible to improve the appearance of your package and save money at the same time? Yes, says the Meridian Fertilizer Factory of Hattiesburg, Mississippi. They report that a new package design has resulted in a substantial saving to the company. Previously the company packaged its fertilizer in a multiwall bag made from white paper and printed in three colors (see above left). In redesigning the package Union Bag-Camp Paper Corporation, multiwall bag manufacturer, used its new Uni-Color process. This gives the effect of a colored outer sheet although the stock is natural color kraft. It also achieves the appearance of a two color design, although only one color is used (see above right).

Monsanto Herbicide Booklet

Weeds and brush along power and telephone lines, railroad rights-of way, pipelines, public highways and on industrial sites such as tank farms can be cleared chemically at a cost averaging one-third below that of hand or mechanical cutting, according to a booklet on the subject published by Monsanto Chemical Co., St. Louis, Mo.

The 24-page booklet points out that various formulations of 2,4-D and 2,4,5-T and mixtures of these chemicals now make possible year-round programs of foliage, basal and stump spraying for maximum weed and brush control at substantial long-term savings of time and money.

A feature of the new booklet is a chart which lists more than 50 common woody plants controllable with 2,4-D, 2,4,5-T and combinations

of these chemicals and the recommended rates of foliage spray.

MSA Lead-in-Air Detector

The new MSA Lead-in-Air Detector Kit assembly being produced by Mine Safety Appliances Company, Pittsburgh, aids in determining hazardous concentrations of poisonous lead vapors in occupational areas.

Use of the new test kit permits prompt "on the spot" determination of the weight of lead present in a measured volume of air. Spot test color comparisons reflect concentrations of lead either below or above the maximum allowable concentration of .20 milligrams per cubic meter.

Included in the kit are an M-S-A 500 ml Samplair Pump, two boxes of glass fiber filter discs, a pair of tweezers for handling filter discs, a kit containing two sets of reagents, color standards and the aluminum carrying case with shoulder strap.

Heavy Duty Twin Mixer

The Rapids Machinery Co., Marion, Iowa, has introduced a new Marion Twin Mixer for heavy duty mixing with up to three tons capacity on either dry or semi-wet materials. A four ton capacity model also is available for dry mixing.

The Marion Twin Mixer has twin arms and blades, and features a four-way mixing action that tumbles the mix from ends to center and also from side to side. The mixer is equipped with a heavy roller chain drive powered by a motor and heavy duty gear reduction unit.

A brochure describing the Marion Twin Mixer may be obtained from the company.

Link Belt Settling Tank

A newly designed settling tank for removal of solids from liquids is announced by Link-Belt Co., Chicago.

The Uniflow Tank features a sloping bottom, with multiple effluent weirs. Link Belt Folder 2648 illustrates the new unit.

Vacuum-Packed Mouse Bait

A vacuum-packed rat and mouse bait in key-open cans is now being marketed by Niagara Chemical Division of Food Machinery and Chemical Corp., New York.

Called Diphacin, the new bait is the first product of its type to employ the vacuum-sealing process, according to the manufacturer. Two package sizes, four-ounce and one-pound, are currently being distributed.

The use of vacuum-sealed cans has certain advantages, according to Niagara Chemical. Food chains are much more receptive to stocking a poison of this type in a permanently sealed can and the can itself may be used as a feeding station for pests.

Old & New Diamond Packages

Results of packaging progress at Diamond Alkali Company, Cleveland, Ohio, are dramatically demonstrated by these two interesting "before and after" photographs. Taken 45 years apart, they show this chemical producer's original product line as packaged in 1912 in then-popular containers (bottom photo), compared with some of the more than 100 Diamond chemicals for industry and agriculture now packed and shipped in new, improved packages (top photo).

They feature a uniform, standardized "family" design theme with an inherently high remembrance value to promote brand identification. Basis of design, carried out in contrasting black and regal red, is the company's recently introduced trademark, "The Chemical Diamond."



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One way an advertising space buyer picks on his budget is to cut it up in little pieces and scatter it around in every magazine that has the word "chemicals" vaguely connected with it. Or, he gets on the right track and concentrates in one magazine—but picks the wrong one.

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Concentrate your advertising in the one strongest magazine in the field—where the customers who really count will read your sales message month after month after month. And the strongest magazine is easy to judge. Just make a check chart on all the points on which two magazines can be compared!

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4. Most Readership
5. Lowest Cost Coverage
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• A. B. of Two Dot, Mont., writes: "My tired budget was pepped up like new again with a concentrated schedule in *Agricultural Chemicals*."



• C. D. of Black Wolf, Neb., writes: "I cured a nagging boss in only two months with *Agricultural Chemicals*."



• E. F. of Peapack, N. J., writes: "A. B. and C. D. are pikers!"



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- ☐ Please rush information on the market and the magazine!
- ☐ Please rush rate card and contract blank!
- ☐ Please rush salesman!

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Company

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TVA Pamphlet

TVA recently issued a new pamphlet, "Fertilizer Science and the American Farmer," to answer some of the numerous requests received concerning information on the TVA experimental fertilizer development program. Copies are available from TVA, New Sprinkle Building, Knoxville, Tenn.

Pellet Mill Bulletin

Details of the Sprout-Waldron Laboratory Pellet Mill are given in Bulletin 176 distributed by the Pellet Mill Division, Sprout Waldon & Co., Inc., Muncy, Pennsylvania.

The bulletin describes practical small scale pelleting, contains complete construction details of the Model 500-L and discusses the advantages of Laboratory Pellet Mills for research studies.

New Filter Area Calculator

A new filter area calculator working on the slide rule principle has been made available by the Niagara Filters Division, American Machine and Metals, Inc., East Moline, Ill.

Pocket sized, the calculator makes possible rapid determination of square feet of filter area required in liquid-solids separation. On one side of the calculator, required area is given in terms of filtration rate and on the reverse side, required filter area is calculated on the basis of cake capacity.

New Split-Eyelet Spray Nozzles

Spraying Systems Co., Bellwood, Ill., announces a newly designed group of split-eyelet spray nozzles and connectors for mounting to spray booms, offering the advantages of greater speed in installation and tight leak-proof clamping. Because the clamp components are separate from the spray nozzle or connector parts, cadmium plated heavy steel that will not bend or break is used for the clamp for strength, and correct metals such as brass, aluminum or stainless steel are used for the parts that touch chemicals. As a result, overall cost of these

units is held to a minimum. These split-eyelet units are supplied as No. 7421 TeeJet Split-Eyelet Spray Nozzles and as No. 7521 TeeJet Split-Eyelet Connectors, and sizes are offered to fit all standard spray boom piping and tubing.

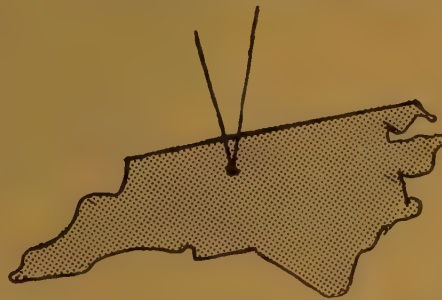
The split-eyelet is mounted to the boom, merely by drilling a 5/16" diameter hole in the boom, inserting the inlet of the nozzle or connector body into the hole, placing the upper clamp section in position and tightening the two bolts.

Kent Industrial Mixers

The Kent Machine Co., Cuyahoga Falls, Ohio, is adapting their continuous cement mixing machines for use in other fields and mixing operations. The Kent machines operate basically on the continuous mixing and discharging principle and are capable of being modified in design as required to mix, blend, sinter, leach, hydrate or dehydrate materials.

A variable drive is generally installed in the mixtures to change the speed and flow of material as required.

GLENDON — at Glendon, N. C.



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INSECTICIDE GRADE PYROPHYLLITE

- ph 6 to 7
- 30 lbs. per cu. ft.
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- non-alkaline
- chemically inert
- 92-95% passes a 325 mesh screen
- non-hygroscopic

Insecticide Grade Pyrophyllite is the ideal diluent and conditioner for all types of insecticidal dusts. As it is non-hygroscopic, dusts compounded with Insecticide Grade Pyrophyllite will not absorb moisture. Nor is there any tendency even during extended storage, for the carrier to separate from the active ingredients.

Insecticide Grade Pyrophyllite has superior adhering properties, and because it is difficult to wet, it holds well on the plant leaves even during rain. When used as a carrier for products to be dusted by airplane, it settles rapidly minimizing drift, waste of materials, etc.

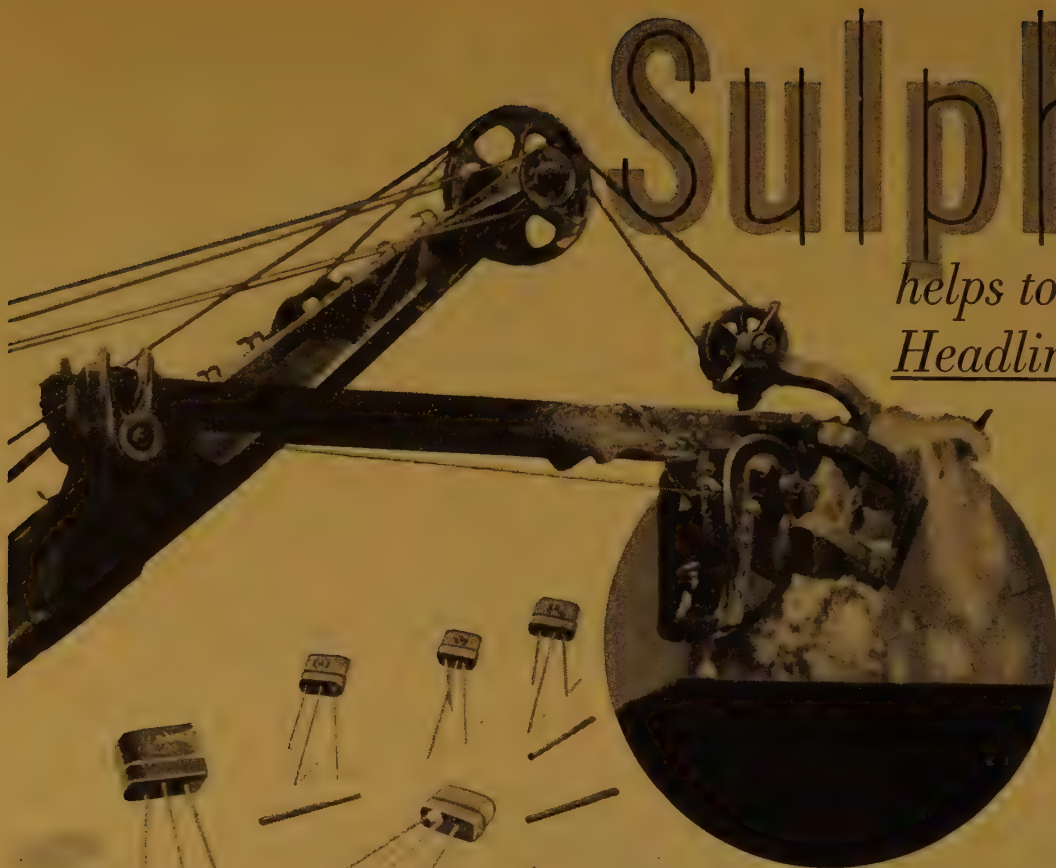
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*helps to create
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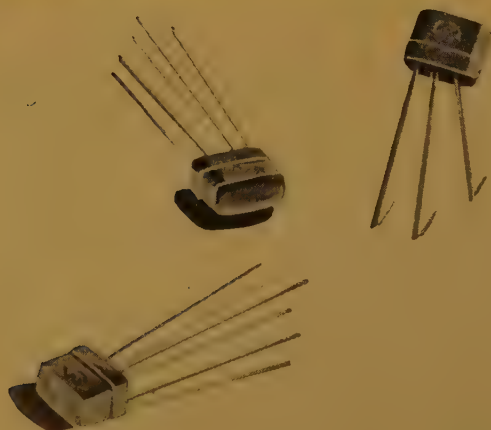
Not too long ago this relatively rare metal was a laboratory curiosity. What to do with it? Today, it's the heart of the tiny transistor—the latest giant of electronics!

What's the connection between Sulphur and Germanium?

There are two, in fact. One is man-made, involving the routine leaching of Germanium ores with Sulphuric Acid prior to tetrachloride distillation. The other takes advantage of a peculiar property of the natural mineral, Germanium Sulphide. This mineral can be volatilized and then sublimed, providing an effective method of separating the Germanium from gangue material. The process is called "Concentration of Germanium by Sulphide Sublimation".

Again Sulphur, through its major derivative, Sulphuric Acid, and a natural sulphide play an important role in our ever-expanding economy. It is difficult to find many items in the broad chemical-metallurgical field that do not somewhere along the production line make use of Sulphur or a derivative.

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Sulphur Producing Units

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- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming

Summit Silicates Bulletin

The Summit Mining Corp., Carlisle, Pa., has published a bulletin describing its full line of hydrous alumina silicates.

Bulletin 1257 summarizes the chemical properties, compatibilities, physical properties, dehydration reactions, and particle size distribution of Summit's Microcite, Ser-X, and Ser-A-Sil.

St. Regis Paper Selector

The St. Regis Paper Co., New York, has announced that an additional quantity of its paper selectors for multiwall paper bags has been made available.

With the selector, designed in a slide rule form for easy reference, it is possible to determine the type of paper best suited to meet individual multiwall bag packaging requirements.

Beckman Soil Booklet

The Beckman Scientific Instruments Division of Beckman Instruments, Inc., Fullerton, Calif., is of-

fering a booklet titled, "What Every Plant Grower Should Know About Soil pH."

The bulletin is designed to help both professional and amateur growers to achieve bigger crop-yields and better lawns with the use of a portable electric pH meter.

Recommend Methoxychlor Dust

The Agricultural Research Service of the USDA is recommending the use of methoxychlor — applied as a dust treatment only—for control of hornflies on dairy cattle.

The USDA recommendation follows the recent decision by the FDA that no residue of methoxychlor is permitted in milk, but there is no objection to the use of methoxychlor on dairy cows if the insecticide is applied so that no residue occurs in milk.

USDA entomologists have found that when methoxychlor is properly applied as a dust treatment to only the backs of dairy cows, no residue occurs in milk and excellent control of hornflies is achieved.

New Applicator for Vapam

A farm equipment dealer in Eugene, Oregon, with a talent for creating gadgets which perform unusual tasks around the farm, has developed a new product with a good potential sales volume. The blade injector, invented by operators of Rear's Farm Supply of Eugene, is an attachment hooked behind a wheel tractor for the purpose of injecting liquid fumigants into the soil.

Now being manufactured by Rear's, the injector was developed in cooperation with Stauffer Chemical Company primarily to apply Stauffer's Vapam. This new fumigant, which controls weeds, weed seeds, symphylids, fungi and other soil-borne pests, can be applied by sprinkling and other methods, but injection has been found most satisfactory for many purposes.

Rear's will build nine injectors for Stauffer distributors located at key points in the Pacific Northwest. Thus, farmers in any part of this region can have Vapam applied by this

method if conditions warrant. If the use of Vapam grows as anticipated, there will be an eventual market for many more injectors.

The implement consists of a horizontal frame which carries two rows of vertical blades. Along the back of each blade is welded a tube with an opening at the bottom. The tubes are connected by rubber tubing to a pipe which carries the Vapam solution, pumped under pressure from a drum mounted on the injector frame. Tiny orifices at the exits from the pipe reduce the pressure, and determine the rate at which the liquid enters the tube.

Dragged behind the tractor, the blades sink into the soil to a depth of three to six inches, as regulated by a hydraulic lift device on the tractor. A water-filled roller behind the injector compacts the soil, providing a seal so that the gas liberated by the Vapam in the soil can do its work most effectively. The hookup of the injector is simple, requiring only about fifteen minutes to assemble.



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Specialized Service to Manufacturers and Distributors of concentrated, high analysis, water soluble plant foods.



Quality Controlled CUSTOM PACKAGING of WATER SOLUBLE FERTILIZERS

We can offer highly accurate formulating and packaging in units of one pound or more . . . with the economies of specialized operation and production line speed. We make shipments under customers labels and shipping tags.

Our experience in blending and formulating should be most helpful to manufacturers projecting new fertilizer products. Our people are available for consultation at our modern packaging plant, Metuchen, N. J.

Davies Nitrate Co.

INCORPORATED

118 LIBERTY STREET NEW YORK 6, N. Y.

BREVITIES

DR. FRANK G. KEENAN has been transferred from his post as manager of the ammonia products section of the Polychemicals Department of E. I. du Pont de Nemours & Co. He becomes associate laboratory director of the department's sales service laboratory at Chesnut Run, near Wilmington.

AC

ALLIED GROWERS SEED Co., Topeka, Kans., has been purchased by Harvey D. Scholten from the previous owner, Mrs. Winifred S. Smith. Mr. Scholten had managed the store for nine years.

AC

DR. JOSEPH D. DALTON has joined the research department of the American Agricultural Chemical Co., New York, and will participate in the firm's fertilizer research program.

AC

PAUL HARRISON FERTILIZER Co., Fresno, Calif., has changed ownership. Under a reorganization the firm is now owned by the Sand Co., Paul Harrison Products and the Roy Nicholson Co.

AC

HANS STAUFFER, president of the Stauffer Chemical Co., New York, has been elected to the National Industrial Conference Board.

AC

AVIATION CONFERENCE — The seventh annual Ohio-Indiana Agricultural Aviation Conference will be held Feb. 26-27 at Ohio State University, Columbus.

AC

THE ELVIN C. STAKMAN award for outstanding research in diseases of cereal crops has been presented to a U. S. D. A. official who is a former student and staff member of the University of Minnesota, H. A. Rodenhiser.

AC

OLIN MATHIESON Co., and an Italian group made up of the Rumian-

ca Corp. and Squibb Italiana will shortly build a new factory for the production of tripolyphosphate near Rome, Italy. The plant will have an annual production of 30,000 metric tons.

AC

CALIFORNIA AMMONIA Co., a new company is building a \$4,800,000 ammonia plant in Lathrop, Calif.

AC

DOMINION FERTILIZERS, LTD., are planning to start construction of a chemical fertilizer plant at Port Maitland, Canada. The plant will manufacture superphosphate for the Canadian market, and the area of the United States bordering on Lake Erie.

AC

SULFUR PRICES announced recently by Mexican producers were \$1 higher per metric ton, narrowing the price gap between US and Mexican sulfur. U S domestic producers last September cut their prices by \$3 to \$24. Mexican prices are now about \$23.

AC

ROBERT LEE BANTON JR., former Northern division superintendent for the F. S. Royster Guano Co., Norfolk, Va., has been appointed general superintendent of the firm's plant operations.

AC

AHOSKIE FERTILIZER Co. has been granted charter of incorporation, listing capital stock of \$100,000. Incorporators: S. S. Pierce, of Ahoskie, N.C.; Luther Powell, Windsor, N.C.; and P. A. Lewis, Jackson, N.C.

AC

CHARTER OF INCORPORATION has been granted the Organite Corp., fertilizers, New York, listing capital stock of 200 shares no par value. Filer of papers: Marshall MacDuffie, New York. Directors: Stephen Varro, Jr., Rego Park, N.Y.; Marshall MacDuffie, New York; and Lawrence M. Crager, Forest Hills, N.Y.

AXON CHEMICAL & FERTILIZER CORP., fertilizer and chemicals, New York, has been granted charter of incorporation, listing capital stock of 200 shares no par value. Directors: John G. Poles, Yorkston W. Grist and Michael Patestides, all of 27 Wall Street, New York City 5, N.Y. Filer of papers: The Prentice Hall Corp.

AC

BERNARD WILLIS has joined the Velsicol International Corp., Nassau, Bahamas. He will headquarter in New York to handle liaison with U.S. suppliers for worldwide distribution.

AC

JOSEPH F. LUTHER has been appointed to the newly-created post of technical assistant to the vice president—sales, Industrial Chemicals Division, Stauffer Chemical Company.

AC

DR. IRVIN J. BELASCO has been advanced to senior research biochemist at the Du Pont Company's Experimental Station. A research biochemist for Du Pont's Polychemicals Department since 1947, Dr. Belasco will continue his studies in search of new uses for urea and other nitrogen compounds for animal and plant nutrition.

AC

JOSEPH J. SWIGART, general manager of Vitro Rare Metals Co., Cannonsburg, Pa., a division of Vitro Corporation of America, has been named a vice president of Berkshire Chemicals, Inc., New York.

AC

VULCAN CONTAINERS INC., Bellwood, Ill. steel shipping drum and pail manufacturer, announced the appointment of Lawrence M. Ferguson, sales manager, as vice president for sales to succeed Herbert B. Scharbach. Eugene W. Gehm has been appointed assistant sales manager.

AC

ST. REGIS PAPER COMPANY announces the opening of a multiwall packaging division sales office in Oklahoma City, Okla. Bruce C. Kelly, previously manager of the company's Little Rock, Arkansas office, will head the new office, located at 9508 Mahler Place, Oklahoma City, Oklahoma.

HIRAM A. CARPENTER of the Coak & Iron Division of Pittsburgh Coke & Chemical Company has been promoted to the newly created position of sales manager, Coke By-Products. He will be responsible for the organization and operation of all sales activities related to coke by-products, including ammonium sulphate.

AC

HUBBARD-HALL CHEMICAL CO., Waterbury, Conn., has announced the retirement on Dec. 31 of Burton B. Fall, senior vice president of the company. Mr. Fall was president of the Rogers & Hubbard Co., Portland, Conn., at the time of its merger on Jan. 1, 1957 with three other fertilizer companies to form the Hubbard-Hall Chemical Co.

AC

FLEA-KILL CORP., manufacturer and distributor of parasiticides, 1004 John Paul Jones avenue, Leesville, La., has been granted charter of incorporation listing capital stock of \$100,000.

AC

STAUFFER CHEMICAL CO. named R. A. Goodling to its Northeast Agricultural Region as a technical field representative covering the south and central areas of Virginia.

AC

C. W. LOOMIS, retired director and vice-president of the Bemis Bro. Bag Company, died December 19 following nearly two years of ill health. He was director of personnel at Bemis' St. Louis General Offices at the time of his retirement in January, 1957.

AC

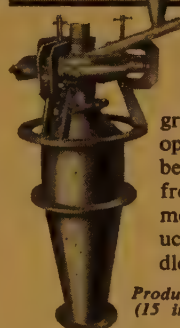
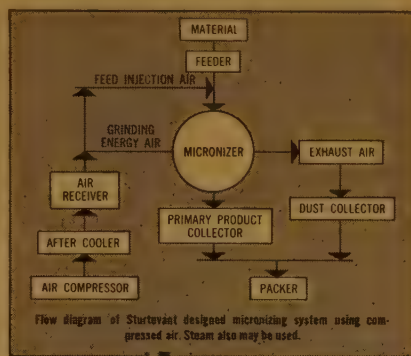
WILLIAM H. BIGELOW has retired and moved to Florida. "Tex" Bigelow has been associated with the sales department of Stauffer Chemical Company for the past 28 years.

AC

H. CARL WIGGINS has joined Bradley & Baker, well-known national sales agents for farm feed ingredients, as their sales representative in Atlanta, Georgia. Mr. Wiggins will cover the states of Georgia and South Carolina.

Need ½ to 44 Microns?

**Sturtevant Micronizers*
Make 325 Mesh Obsolete**



Production Model
(15 in. chamber)

One Operation Reduces, Classifies

Sturtevant Micronizers grind and classify in one operation in a single chamber—provide fines in range from ½ to 44 microns to meet today's increased product fineness needs. Can handle heat-sensitive materials.

No Attritional Heat

Particles in high speed rotation, propelled by compressed air entering shallow chamber at angles to periphery, grind each other by violent impact. Design gives instant accessibility, easy cleaning. No moving parts.

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Centrifugal force keeps oversize material in grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size.

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Grinding chambers range from 2 in. diameter laboratory size (½ to 1 lb. per hr. capacity) to large 36 in. diameter production size (500 to 4000 lbs. per hr. capacity). For full description, request Bulletin No. 091.

Engineered for Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to under 1 micron at feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200-1400 lbs. per hr. A pharmaceutical house uses an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns.

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Fulton Reports Earnings

Total sales by the Fulton Bag & Cotton Mills, Atlanta, Ga., during 1957 were in excess of \$37,000,000, according to the company's annual report to stockholders last month.

During the past year Fulton disposed of several of its branch bag plants to give greater emphasis to its Atlanta mill and manufacturing operations. By concentrating its manufacturing and sales operations in Atlanta, the company expects to improve production efficiency.

A modernization program for the Atlanta facility will be continued and expanded during 1958 and in subsequent years, it was reported.

Clarence E. Elsas was elected to serve as president of the company in 1958 by the stockholders.

Joins American Flouride

Helene A. Whelan has joined the American Flouride Corp., New York, as a special sales representative.

Miss Whelan, who has been associated with the insecticide market for many years, will specialize in sales of chemicals and related products to the pest control field for American Flouride.

Col. Compton Joins Best Co.

Col. Thomas C. Compton, USA (Ret.) has joined the Best Fertilizers Co., Oakland, Calif., as executive assistant to the president.

Col. Compton is presently located at the company's Oakland office but will move to the Lathrop, Calif., plant and office later this year. He retired from the Army on Dec. 31, 1957.

WEED CONFERENCE

(From Page 40)

Vern Olney, Geigy Agricultural Chemicals, Fresno, Calif. discussed Simazin and its use as a pre-emergent herbicide. At present this is registered for weed control in non-crop areas. While not currently recommended (or registered) for row crop uses, corn is especially tolerant to this chemical, and rates of 2 to 4 pounds of the 50% wettable powder give seasonal

weed control on corn. Asparagus and strawberries are other crops on which it has shown up well. Rather high rates when applied to grapes, citrus, olives, apples and pears have caused no injury in California. Stone fruits appear to be more susceptible. Ed Boles, Pennsylvania Salt Company, indicated that federal registration had now been granted for use of Endothal on table beets, sugar beets, and spinach.

Aaron Stull, Union Carbide Chemicals Co., Riverside, Calif. discussed a new 50% Mylone formulation on wheat bran. This general non-selective soil fumigant is effective against certain weeds, root-knot nematodes and certain fungi in the soil. The wheat bran formulation enables users to place the product on the soil surface, and then wash it in. Previously, when the material was worked into light sandy soils, additional water would wash the chemical from the desired zone required for maximum activity.★★

PESTORAMA

(From Page 37)

larger plants, higher infestation, harder to kill weevils, and various other factors.

"The chlorinated hydrocarbons that have proved satisfactory for control of the boll weevil and various other cotton insects are: aldrin, BHC, dieldrin, endrin, heptachlor, and toxaphene. The three phosphorus compounds which have proved effective in controlling the boll weevil are guthion, malathion and methyl parathion. Malathion and methyl parathion have short residual action. Sprays and dusts are about equally effective."

In statements of precaution to be observed in handling insecticides, it was noted that the chlorinated hydrocarbon insecticides are generally considered relatively safe materials to handle; however, endrin is more toxic to man and animals than other chlorinated hydrocarbons.

Demeton, guthion, methyl parathion, and parathion are much more toxic than other recommended insect-

icides. Users are urged to avoid skin contact, and not to breathe vapors or drift from spray or dust. Spray concentrates, it was cautioned, are readily absorbed through the skin . . . and these materials must be handled with care.

In a further discussion on safety in handling insecticides, Harold H. Golz, American Cyanamid Co., remarked that one of the safest insecticides available is malathion. "To date, many million pounds of technical malathion have been used with a safety record that is not even closely approximated by most of the other pesticides." The only other phosphates that appear to have as low a degree of toxicity are dipterex, phostex, dicapthon and its isomer chlorthion. None of these has been granted a residue tolerance, and none appears to have the spectrum of insecticidal activity exhibited by malathion.

It is an indisputable fact that any chemical substance, regardless of its nature, may be harmful to man or animals if indiscriminate exposure is permitted. Therefore, it is only good common sense to avoid unnecessary exposure. Observance of the following simple rules, said Dr. Golz, would be adequate to prevent 9/10 of the accidents with agricultural chemicals:

- Read and heed the label
- Avoid skin contamination
- Avoid breathing fumes, dust
- Personal hygiene

While these rules will prevent accidents with most agricultural chemicals, they will not, he cautioned, be adequate for handling the more highly toxic substances, such as parathion, endrin, etc. For these, rubber gloves, water proof clothing, periodic testing of blood cholinesterase activity, etc, is necessary.

New Pesticides

IN a forum on new pesticide materials, moderated by J. A. Lyle, API, the use and properties of simazin were described by John E. Clark, Geigy Agricultural Chemical Co. Mr. Clark indicated that although simazin is currently labeled as a soil sterilant, tests indicate that it is very effective in weed control on corn, and that label approval is under consideration.

Complete control of weeds in corn, eliminating need of cultivation, is the promising outlook.

R. Miller, Dow Chemical Co., Greenville, Miss., discussed two new insecticides offered by Dow Chemical Co.: korlan, a phosphoro thioate, which has been approved for fly control on dairy animals,—and Dow ET-57, now known as trolene, which is effective for the control of cattle grubs when used orally.

Korlan is described as a residual insecticide, with a low toxicity to warm blooded animals. Dow ET-57 is not approved for lactating dairy animals, and should not be administered 60 days before slaughter.

Ornamentals and Fruits

SEVERAL discussions concerned pest control on ornamentals, orchards, etc. D. L. Gill, USDA, indicated that arasan, dineb and ferbam are safe and effective in control of certain diseases on ornamentals. Terachlor controls sprouting diseases; VPM and VAPAM control certain fungus problems. He cautioned extra care in handling the materials demeton and systox.

C. C. Carlton, API, reviewed some of the diseases of fruits, while T. B. Hageler, API, reported on insect and disease control on pecans, grapes and other fruits. He indicated that DDT is still most effective in the control of leaf hopper and grape berry moth.

Other speakers participating in the two-day program included: C. Wilson, USDA; E. F. Kennamer, Fish and Wildlife Service; H. R. Johnson, Forest Exp. Station; A. F. Verrall, S. Forest Exp. Station; C. Lofgren, USDA; W. L. Popham, USDA.

API staff members: W. Arthur, G. H. Blake, E. J. Cairns, E. A. Curl, D. E. Davis, P. O. Davis, U. L. Diener, R. B. Draughon, F. E. Guyton, L. L. Hyche, S. T. Jones, H. P. Orr, A. M. Pearson, V. S. Searcy, R. L. Self, A. L. Smith, and L. M. Ware.

Presiding at the general sessions were: E. V. Smith, Dean of API School of Agriculture; W. G. Eden, secretary-treasurer of AACEP; John R. Cook, president Alabama Pest Control Association; R. B. Draughon, president, Alabama Polytechnic Institute; P. O. Davis, director API Agricultural Extension Service; U. L. Diener, retiring vice president, AACEP, and W. A. Ruffin, API.

FERTILIZER VIEWS

(From Page 60)

izer salts, and the agronomist needs to study such alterations as a whole if he is to reach sound conclusions. The ratio of pH to pC is suggested as one means of helping to judge fertilizer balance from the ionic situations which develop in the soil and confront the plant. The problem is rather complex but it serves no good purpose to oversimplify it.

Soil Conditioners: Retrospect

It is now five years since the first announcement of the use of synthetic polymers to stabilize soil structure. The initial publicity created wide interest in these chemicals and in the field of soil science.

Anything that affects the structure of a soil may be considered a soil conditioner. From this point of view, soil conditioners may include gypsum or land plaster, manures, fertilizers, the numerous synthetic chemicals alluded to previously, modified humus or peat, derivatives of cellulose and many other materials. Because of the startling claims made in the first announcement of the use of polymers the entire agricultural world was aroused to further investigation. The literature on the subject since has become voluminous.

What is the present status following the vast amount of research devoted to the subject? A survey reported in California* reviews the work and concludes that the claims made for the synthetic polymers have been to a large extent substantiated, but their relatively high cost per acre is the one factor which has mitigated against their general use in agriculture. They are being used for special purposes as in nurseries, on golf courses and in flower beds. However, the polymers have done much good in that they generated a great deal of research in the chemistry of soil structure with consequent enlargement of our knowledge of this phase of soil science.

*Journal of Agricultural and Food Chemistry, Volume 4, p. 842 (1956)

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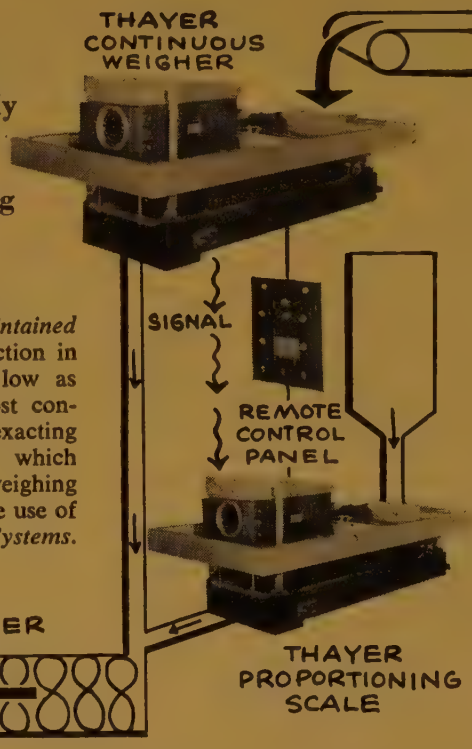
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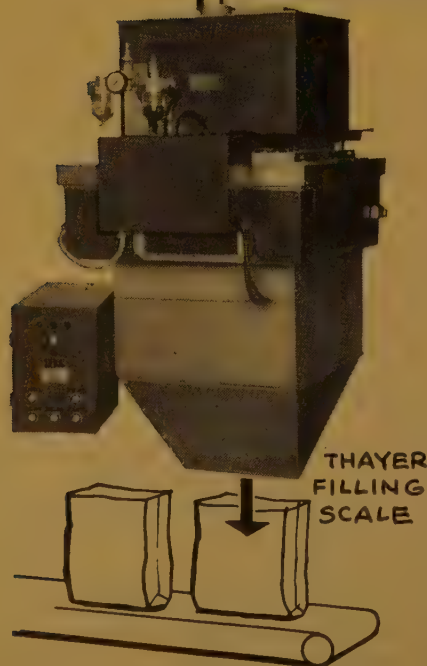
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THE THAYER SCALE CORP., 4 Thayer Park, Pembroke, Mass.

FERTILIZER BUYING

(From Page 49.)

per cent of the farmers questioned. Forty per cent said they fertilized truck crops with 12 12 12 fertilizer.

Ninety-six per cent of the farmers queried used commercial fertilizer in bags rather than in bulk and 98 per cent of the farmers applied their fertilizer themselves.

When considering which of several brands of fertilizer to buy, farmers give first consideration to price, quality, and form of the product. The reputations of the dealer and manufacturer were ranked far behind these considerations.

When buying fertilizer, 66 per cent of the farmers said they would be willing to pay a slightly higher price per ton if they were satisfied with product quality. Only 40 per cent said they would be willing to pay a slightly higher price if they were satisfied with the reputation of the dealer, and 43 per cent said that they would pay the higher price if they were satisfied with the reputation of the manufacturer. If they were satisfied with the product form, 61 per cent would pay a higher price.★★

PARATHION PLANT

(From Page 41)

WHAT are Monsanto's plans for this new production unit? What about the relative dangers of using the organophosphorous insecticides? How will the products be marketed? To answer these and other questions Monsanto held a special press conference at Anniston on Jan. 16.

Clay Barber, the company's technical agricultural sales manager, outlined Monsanto's plans for marketing "Niran" and methyl parathion. As with most other insecticides used on cotton, he reported, the weather is a principal factor affecting insect infestations. Since the 1957 crop return, particularly in the delta, was poor, the general economic situation is not good.

However, Mr. Barber remarked, increased evidence of boll weevil resistance to the chlorinated hydrocarbon insecticides is expected to generally stimulate the market for the organophosphorous insecticides in '58.

"As with most insecticides," he said, "the farmer wants them in a matter of days, and for that reason demand tends to be inconsistently heavy in certain areas at certain times. With the production from the Anniston plant, we expect to be able to meet these demands wherever they occur."

He reported that the per acre cost for a ¼-pound application of methyl parathion would range from 70 to 80 cents, thus making the organophosphorous compounds economically competitive with the other commonly-used cotton insecticides. He predicted increased use of methyl parathion on a number of other crop types, particularly on forage crops and small grains. For "Niran" he predicted further use on citrus fruits, vegetables, horticultural crops, ornamentals, and small grains.

Dr. M. E. Merkl, an entomologist with the Entomology Research Service at the USDA's Delta Research Station, Stoneville, Miss., declared that organophosphates appear to kill the boll weevil better than any other insecticide. Remarking about the "general trend toward more toxic materials," Dr. Merkl warned that 1957 will be an especially "cost-conscious year" for the farmer because of the heavy loss he absorbed in last year's excessive rains.

He pointed out that the farmer must be shown that it is economically feasible to use methyl parathion for boll weevil control. Success in sales, he reported will depend on the competitive price, whether the farmer can learn to use the product properly, and the quickness of kill.

With organophosphorous compounds, he said, the USDA had been urging repeated applications of low dosages. "The farmer has to be reminded time and time again that there is no particular advantage (to the cotton) in keeping the weevil infestation below 40%.

"The prime questions the farmer asks himself are 1. will it kill? 2. how much will it cost? and 3. how much personal danger do I risk in using it? How much emphasis he gives each of these depends on the particular year. For instance, in 1955 the boll weevil got away from the cotton farmer, particularly in the Delta, and the most important factor was *will it kill?*

"In 1958, on the other hand, the prime consideration will be cost, mainly because of the sizeable crop losses in the Delta last year."

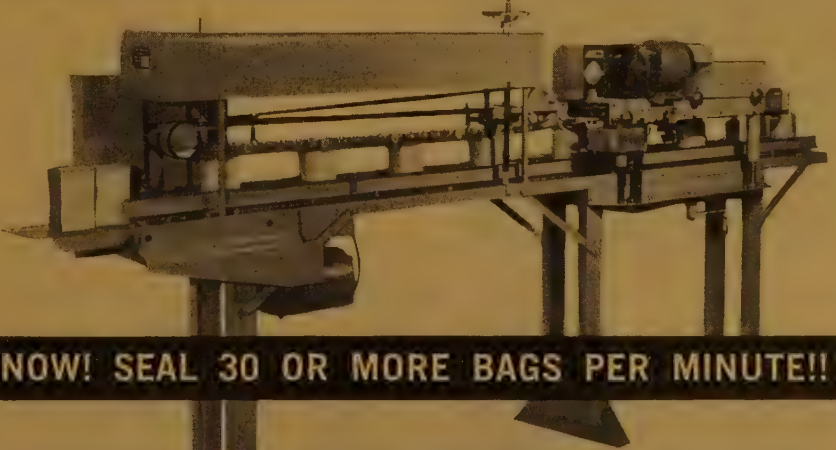
On the question of the relative perils of the organophosphorous compounds, Dr. Merkl pointed out that in the state of Mississippi alone there were seven fatal aircraft accidents in 1956, five of them attributed to the effects of these compounds. He reported that, by more carefully educating the pilots through the Civil Aeronautics Board, Mississippi aviation clubs, etc., the figure was reduced to but one fatal aircraft spraying accident in 1957.

Pursuing the poisoning question

further, Dr. C. S. Petty, of the Louisiana State University School of Medicine, reported that there were six proven cases of organophosphorous insecticide poisoning in his state last year, none fatal.

Though none of these occurred among spray pilots, Dr. Petty reported that the psychic effects on some caused researchers concern. He cited instances of pilots' reporting a peculiar loss of perceptive abilities (including the ability to judge distances), a general lack of time perception, and other manifestations such as their continuing to fly after the spray tanks were empty. He admitted that for aerial spraying organophosphorous compounds can be generally considered *more* dangerous than other insecticides commonly applied by airplane.

"One of the confusions about these compounds is that there is a concept being continually propounded that one must look like a man from Mars to use them with safety." Actually, he pointed out, excessive summer temperatures, particularly in



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Because "Super Cordura" is far stronger than ordinary-fiber threads, danger of seam breakage is minimized—drop tests prove it. And because sewing with "Super Cordura" is more efficient, you save money in your closing operations. There are less breaks during closing; one thread does most jobs, reducing thread inventory.

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the Delta region, make such extreme precautions impractical.

"Agreement should be obtained from both producers and users on the minimal precautions necessary for practical protection of the user."★★

LIQUID FERTILIZER

(From Page 45)

cluding Sohioen Solution 17, a new product.

The first of the two new manuals, copies of which are now available to the trade, opens with a definition of liquid fertilizers and a brief history of their use. Convenience is singled out as the prime reason why liquid fertilizers are currently enjoying such a phenomenal rate of growth. Convenience is of course somewhat offset by the lower analysis products available and the higher raw material costs. Leaders in the industry agree, it is noted, "that liquid fertilizers will not generally replace dry fertilizers. In areas where convenience is a major factor; however, liquid fertilizers will definitely play a part in increasing the fertilizer used."

A discussion on "How Liquid Fertilizers Are Made" follows, including a review of typical batch or continuous process operations. Raw materials are reviewed including anhydrous ammonia, aqua ammonia, urea, ammonium nitrate, phosphoric acid, ammonium phosphate, muriate of potash and potassium hydroxide. Variations in the amount of ammonia that is reacted with a given quantity of phosphoric acid have considerable effect on the resultant liquid fertilizer. The manual suggests a rate of 8.11 lbs. of ammonia for each 20 lbs. of P_2O_5 , which provides the most satisfactory compromise on the various factors of corrosion, loss of ammonia, solubility, etc.

A considerable portion of the booklet is devoted to reproductions of typical saturation curves illustrating the properties of 21 representative grades of liquid fertilizer. Sohio's laboratory has done extensive work on the properties of the various grades of liquid fertilizer.

Another section reviews "How to Formulate Liquid Fertilizers." Sohio offers a free cost analysis and formulation service for the liquid fertilizer manufacturer. Suggestions are advanced on handling nitrogen solutions, including methods of transfer, precautions for cold weather, safety suggestions, etc.★★

EDITORIAL

(Continued from Page 27)

and wildlife in connection with its use.

It is rather surprising to see the *Times* this far off base. To begin with, we scarcely see just why the problem concerns them, for the fire ant program will be confined to the southern belt of states from Florida across to Texas, and we doubt that a spray application will be made within five hundred miles of New York. Also, while there is obviously some degree of hazard in connection with any such spray program, it must be counterbalanced against the hazard involved to the population in failure to control, or against the hazard which will result if, through failure of qualified agencies to act, toxic materials are used without supervision or guidance by thousands of individual farmers.

In the final analysis we would say that it is better to let the decision on entomological matters be made by entomological experts, — rather than by editorial writers. The latter scarcely qualify as experts on the subject, and their decisions are always suspect as being colored by a desire to sell newspapers.★★

AERIAL SAFETY

(From Page 47)

cide materials are washed off an aircraft prior to their doing any maintenance work.

Coordination between the farmer and the aerial applicator has become increasingly important. The farmer should be advised of the safe limits of organic phosphates and there should be a discussion as to how the materials should be applied to best safeguard persons and animals within

the immediate area. This coordinating is done in advance of a particular job in order that the haste which frequently occurs will not impair the safety of the job being done.

The safety manual published by the Mississippi Aeronautics Commission early last summer listed all these precautions and is typical of information prepared by other states to inform aerial applicators of the hazards involved in handling and applying organic phosphates. They also served to attract the attention of applicators to the instructions listed on the manufacturer's label.★★

MICRONIZER

(From Page 95)

air or steam, which causes violent impact of the particles and results in fine pulverization without attritional heat. The major use of "Micronizers" has continued to be the simultaneous dry grinding and classification of superfine solids to a degree impossible

by other commercial machines. Tests have shown that certain materials behave in totally different ways when reduced to particle sizes in the lower micron range.

Material to be processed is introduced into the shallow grinding chamber through an opening near the periphery. Adjustments of feed rate and/or volume or pressure of the grinding fluid maintain product uniformity in the desired size range. While fines are collected and classified at the center of the grinding chamber, centrifugal force created by the high speed jets tends to keep the coarse particles in the grinding zone until they are sufficiently reduced to move inward to the point of discharge.

Eight sizes of Micronizers are manufactured by Sturtevant. The two smallest are 2" and 4" in diameter and are used mainly for laboratory work. The largest model, 6" in diameter, offers a capacity of from 500 lbs. to more than two tons per hour, depending upon the material and the desired reduction.★★

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NE WEED CONF

(From Page 31)

Weed Control in Turf

J. R. Fulwider and R. I. Engel, Rutgers University, summarized results of pre-emergence control of goosegrass in turf areas, reporting:

"Chlordane gave highly satisfactory control of goosegrass when used as a pre-emergence treatment. Before a general recommendation can be made for chlordane, more results on season and rate of application should be obtained.

"All rates of EPTC, Simazin, Neburon at 4 pounds per acre, and TBA were too injurious to the turf grass to give satisfactory pre-emergence treatments.

"Arsenate of lead, Sesin, and Neburon showed some pre-emergence control. The value of the latter treatment was reduced by turfgrass injury.

"PMA, PMA plus 2,4-D, CDAA at both rates, CDAA and TBA combination, and FW-450 did not give any damaging effects on the turf, but they did not show good pre-emergence control."

The Custom Applicator

THE importance of a specialist for weed control operations was emphasized by F. S. Kirkpatrick, Western Soil Management, Newark, N. J., who observed that technical knowledge is essential to the applicator, who must not only be familiar with the basic knowledge of weed control, but be familiar with the experimental work of others. Companies assigning the job to their general maintenance man or plant engineer encounter several problems, based on lack of training and knowledge. Mr. Kirkpatrick expressed confidence in the role of industrial weed control in the future. This phase will expand tremendously in the next few years, he believes.

Ragweed Control

DISCUSSIONS of the ragweed problem, and its relation to hay fever and public health, in general, interested an audience not necessarily in the agricultural chemical field. Public health officials, plant maintenance

engineers, etc., swelled the usual group of conferees at the NE Weed meeting. Control measures against this pest include 2,4-D sprays; 2,4-D plus 2,4,5-T sprays, cutting ragweed in June and July, and again in August if it is still growing; pulling ragweed out by the roots during June and July.

Ragweed nuisances include pollen pollution of air, absenteeism due to hay fever, places harboring rats and insects, a source of weed fires.

Program members participating in the ragweed discussions included: C. N. Howison, Air Pollution Control League; Elzear Campagna, Univ. of Laval, Canada; R. P. Wodehouse, Lederle Laboratories; M. S. Bowen, Shade Tree Supt., Teaneck, N. J.; and L. V. Fucci, Hay Fever Prevention Society.★★

TVA CONE MIXER

(From Page 35)

resulting mix in the den, none in the cone. The gases percolating through

the hardening bed of super tend to make it a very light, honey combed mass. Because of the short retention time in the cone, the mix going to the den is very fluid. Dens must be kept tight to contain the super. Apparently because of lack of stirring, the mix gives a feature to the finished super that is both good and bad. Super made in cones tends to have a very fine particle structure. Each individual particle of rock appears to retain its own identity. The resulting super, because of its small particle size, is very easy to ammoniate. The small particle size, however, can make the super rather dusty to handle, which can be a nuisance in handling in the mill, and if not granulated, in the field.

The main advantage of a cone super mill is that the mixing machinery is easier to maintain and has a much lower initial cost than any other conventional means of making super. Normal replacement of worn parts of the mixing unit, weighing and feed equipment, is estimated to be about 1¢ to 2¢ per ton. — Allen S. Jackson.

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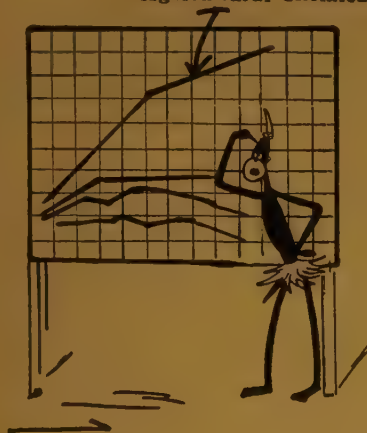
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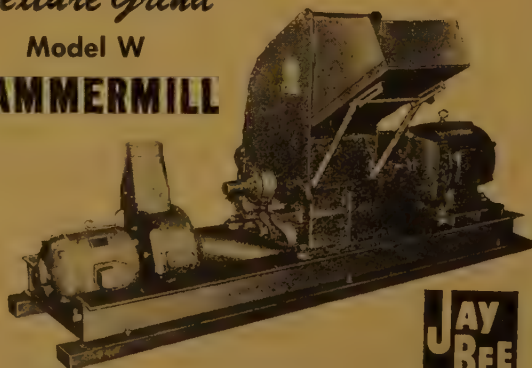
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Mr. Sutherlin succeeds P. E. Nelson, recently appointed to the Chase Paper Bag Division.

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Panogen Is Morton Division

Panogen, Inc., Ringwood, Ill., and Larvacide Products, Inc., have been merged into a division of the Morton Chemical Co. under the name, Panogen Co., division of Morton Chemical Co., Chicago.

The Morton Chemical Co. is a new subsidiary of the Morton Salt Co. to which has been transferred all manufacturing, sales, and research activities in the chemicals field. Joseph E. Rich, formerly vice president of Morton's chemical division, is president of the new company.

Companies and properties transferred to the new Morton Chemical Co. besides Panogen and Larvacide Products, consist of Morton Salt's chemical plants in Weeks Island, La., Manistee, Mich., the Ringwood Chemical Co., Ringwood, Ill., and Morton's research laboratory, Woodstock, Ill.

Panogen Co. continues to sell Panogen liquid seed disinfectant and Drinox liquid seed treatment insecticide.

PUTTING OUT THE FIRE ANT

With \$2.4 million supplied by Congress, the Department of Agriculture has already started on its program to spread across millions of acres of Southern farmland a lethal poison known as dieldrin, more toxic than DDT, and to do it at the rate of two pounds per acre. The purpose: to control the growing fire ant plague. There is good reason to get rid of the fire ant. It builds large mounds that damage pastures; it injures young livestock; it harms some vegetation; and its irritating bite makes it difficult to persuade farm labor to work in the fields where the insect is present.

But the cure to which the Agriculture Department is suddenly committing itself on such an enormous scale may well be infinitely worse than the fire ant's burn. It is rank folly for the Government to embark on an insect-control program of this scope without knowing precisely what damage the pesticide itself will do to both human and animal life, especially over a long period. No one yet knows the answer to this question or to many other related questions of insect control—yet the department plunges blithely ahead. But

enough is known to arouse the gravest concern on the part of many scientists and conservationists.

In a study of pesticides prepared before the fire ant question became a public issue but just released, Dr. John George of the New York Zoological Society notes that dieldrin "killed all rodents and rabbits" at a lower dosage than that now being used in the South, and killed birds at one-tenth the present rate. Pointing out that there have been relatively few studies of the long-range effects of insecticides on various forms of wildlife, he urges fundamental research "so that we can get solid answers to some of these perplexing problems."

The Zoological Society and Conservation Foundation are undertaking such a study; but much more extensive research than they can afford is required. Some of the money Congress is now spending on this control program would be put to better use on projects studying just what the spread of toxic chemicals from the air will do to bird and animal life and reproduction, and to human health.

The above editorial is reprinted from the Jan. 8, 1958 edition of *The New York Times*. For further comments on the fire ant eradication program and the Department of Agriculture's views on the program, see pages 29 and 51 of this issue.



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TALE ENDS

THE *New York Times* news feature and editorial departments should get together and let one hand know what the other is doing. In the December 23rd issue of the *Times* John C. Devlin had an excellent and thoroughly objective article on the USDA's spray program to control the fire ant. Then, two weeks later, the editorial department hopped all over the project in an editorial which referred to the program as "rank folly" and accused the USDA

of "blithely plunging ahead" without adequate knowledge of the possible extent of long-range damage that might be done to fish and wildlife, domestic and farm animals, etc. For a minute it sounded like it had been written by our old pal, Bill Longgood, the insecticide expert of the *World Telegram* sans technical qualifications. But, on re-reading we decided it couldn't be. Didn't use the word "douse" even once.

Perhaps not everyone in the ag chemical field recalls that 2,4-D, which has established a big reputation for itself as a herbicide over the past ten or twelve years, was developed initially as a plant growth stimulant. U. S. Rubber Co. has been continuing to investigate use of 2,4-D for its original use. In a series of tests on its rubber plantations in Malaya and Indonesia over the past five years, latex yields have been raised as much as 25 to 40 percent through applications of less than an ounce of 2,4-D per tree, it is reported. The stimulating effect has kept old trees, up to 50 years of age, producing at a profitable rate, and has stimulated young trees to produce at an abnormally high rate.

AC

Dr. Alvin J. Cox, for years chief of the Bureau of Chemistry of the California State Department of Agriculture, and now a consultant and adviser on agricultural chemical problems, writes from his home in Palo Alto to report that he is contemplating an eastern trip this spring, the first in several years.

AC

Will cotton acreage allotments be boosted for '58, or won't they? And how will this affect sale of cotton poisons? Some growers and textile manufacturers have been campaigning for increased acreage this season, while the International Cotton Advisory Committee warns that high grade cotton is no longer in good supply and the situation could become tight.

Secretary Benson cooled hopes for an acreage increase, however, at a press conference in mid-January, in the course of which he pointed out that he could boost cotton allotments only if price supports were lowered. He warned it would be "very unwise" to allow farmers to increase their cotton acreage at the same time they are eligible for soil bank payments for cutting back production.

Meanwhile cotton farmers are reported to be having trouble getting good seed for planting their '58 crop,—and added trouble in paying for their 57 pesticides and fertilizers. Much of the seed produced last year is NG,—not germinating—and cotton that should have been picked last October is still being picked in some areas. Trouble in the Cotton Belt.

AC

The agricultural aerial applicator has graduated to TV fame, being the villain's tool in a recent (early in January) showing by eastern viewers of "Sky King." To review the story briefly; the villain is about to foreclose the mortgage on our hero's farm (a good guy just out of the navy, who doesn't know anything about farming). Our hero contracts with a crop duster to treat his alfalfa crop, so that he can protect it against bugs and sell it to pay off the mortgage. But meanwhile back at the ranch the villain sneaks off to bribe the crop duster to spread weed killer over the alfalfa. The crop is lost, of course, but the evil doings are found out, and the villain tears up the mortgage and is run out of town (with the crop duster).

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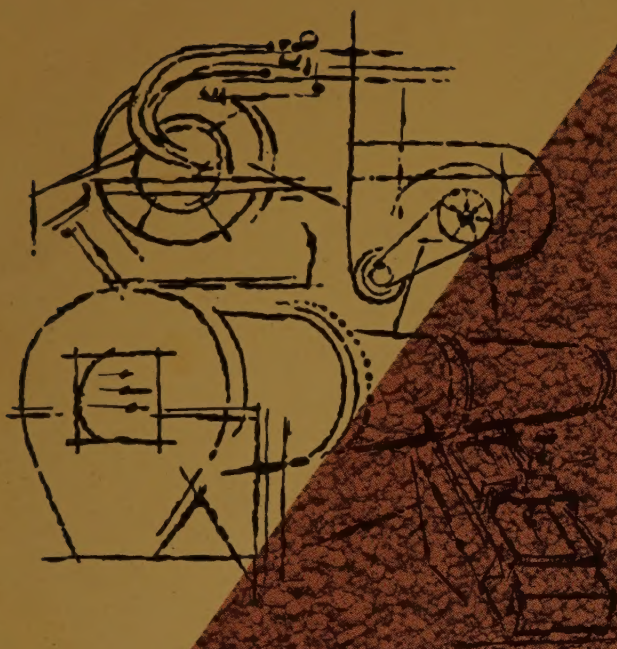
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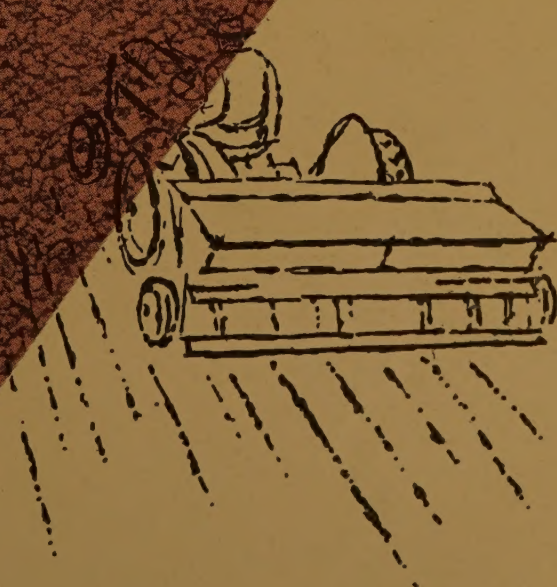
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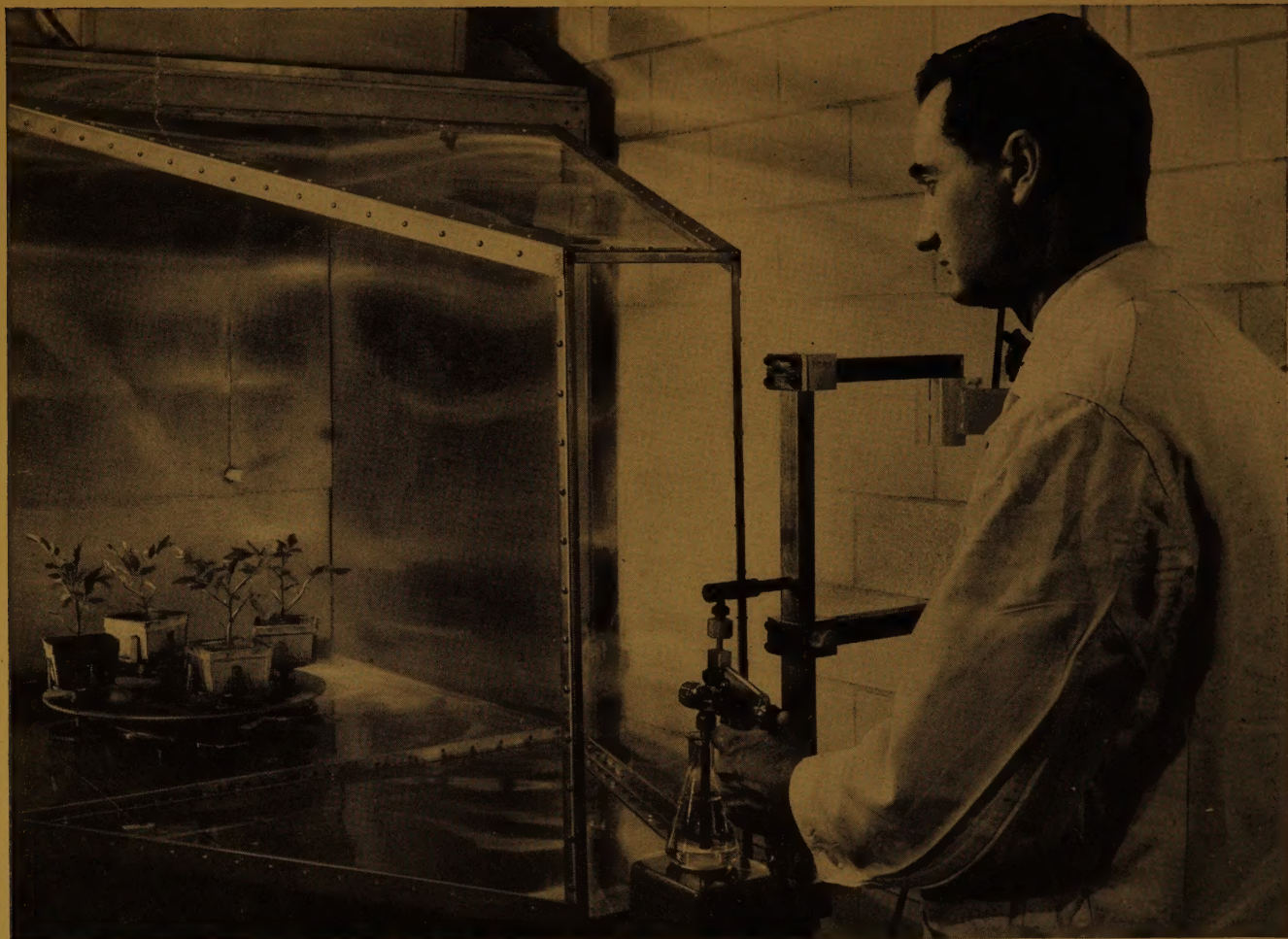
Here is a DUAL PURPOSE, coarse grade muriate of potash. Designed primarily for use in granulation. It gives a higher yield of on-size product. It is also ideal for direct application and for the manufacture of top dresser goods.

National Potash standard grade muriate is designed to fit the needs of conventional fertilizers. Processed for a dust-free, non-caking muriate.



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